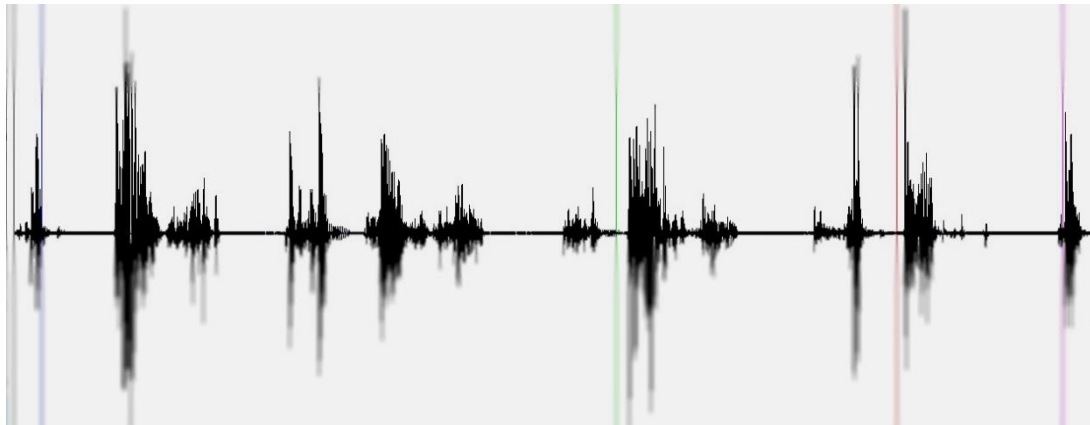


# ZSP INSTRUCTION MANUAL

## ZIMO Sound Programmer

ISSUES:

2020 Nov  
2024 Mar



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## 1 - Hardware requirements

- PC with Windows operating system  
MXDECUP, MX31ZL oder MXULF

## 2 - Hardware Connection

### 2.1 - With MXDECUP

- Connect the supplied power supply unit to the mains and MXDECUP
- Connect MXDECUP to PC via serial cable or USB to serial converter
- Connect the programming track or decoder to the rail output of the MXDECUP

### 2.2 - With MX31ZL

- Power MX31ZL via the supplied power supply unit and cable
- MX31ZL Connect to the USB port of the PC using the supplied cable
- Connect the programming track or decoder to the rail output of the MX31ZL

### 2.3 - With MXULF

- Connect MXULF to supply voltage source
- Connect MXULF to PC via USB cable
- Connect the programming track or decoder to the rail output of the MXULF or connect the decoder to the MXULF via MXTAP using a SUSI cable.

Note: After connecting the MX31ZL to the PC for the first time, it will ask for a driver. Select the file "ZIMO\_MX31ZL.inf" from the ZIMO folder. (usually C:\Program Files\ZIMO)

## 3 - Installing and starting ZSP

- Download ZSP from the ZIMO homepage [www.zimo.at](http://www.zimo.at)
- Start the downloaded installation file and follow the instructions
- ZSP starts automatically after installation

Note: Depending on the setting, ZSP starts with a start screen or the last open project.



## 4 - Load and save a sound project

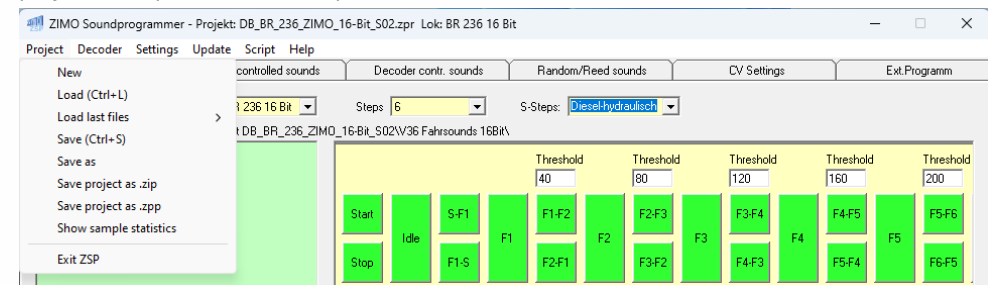
### 4.1 - Load

A sound project is already installed with ZSP. Additional projects must be downloaded from the ZIMO homepage if required. The downloaded projects are in a compressed ZIP archive and must be decompressed into any folder on the hard disc before use. Alternatively, the .zip archive can be opened directly and will then be automatically downloaded:

"...\Documents\ZIMO\Projekte\" entpackt und geöffnet.

Each project consists of a project file and a number of WAV files that must be located in the same folder as the project file or a subfolder thereof.

To load a project, press "Open existing sound project for editing" on the start screen or "Project" - "Load" in the main window. Then select the folder in which the project is located, select the project file (.zpr) and click on "Open".



## 4.2 - Save

To save the project under the same name, click on "Save".

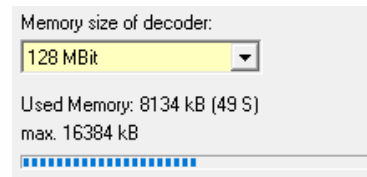
To save the project under a new name, click on "Save as". If a folder other than the current one is selected, all .wav files assigned to the project are copied to the new folder.

To share the project, click on "Save project as .zip" after saving. The entire folder is packed into a ZIP file which can then be sent by e-mail, for example.

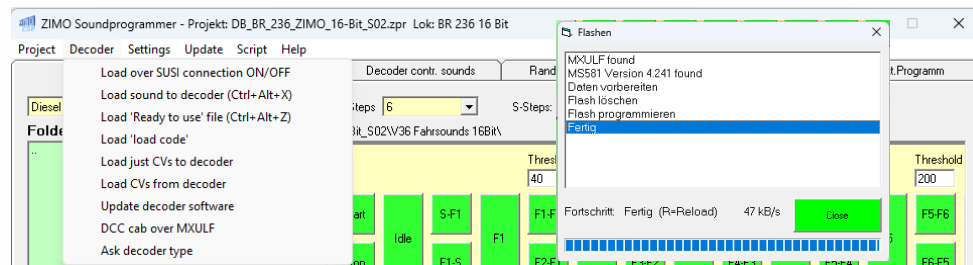
To pass on the project as a single file that can no longer be edited or encrypted, click on "Create ready to use project". For encoding (coded sound projects) a separate programme is required which is provided for sound providers certified by ZIMO.

## 4.3 - Selecting the decoder type

At the bottom right of the Samples window, you can select the memory size of the intended decoder to see an overview of the memory currently required for the project. Older MX decoder models have 16 Mbit, current MX decoders have 32 Mbit and MS decoders have 128 Mbit memory for sound projects.



## 5 - Load sound project into the decoder



1. decoder menu - If via SUSI first item: Load over SUSI connection ON/OFF tick the box, if via track then do not tick the box.
2. Select Load sound to decoder. Confirm the window "Write new sound to the decoder?" with OK. The process starts with a new window, once completed "Fertig" is displayed and the button Abort turns from red to green, also now displays "Close".

## 5.1 - Load over SUSI connection ON/OFF

If the box is ticked, sound and CV programming takes place via SUSI.

If not ticked, sound and CV programming takes place via rail/programming track.

## 5.2 - Load sound to decoder

Via USB cable (mini) with MXULF

### 5.2...1 - Load "Ready to use file"

Select a ready-to-use sound project (.zpp) and import it into the decoder.

### 5.2...2 - Load „load code“

Before an encrypted sound can be played, the "Load Code" corresponding to the serial number of the decoder must be programmed in CVs 260 to 263. This can also be done via ZSP.

### 5.2...3 - Load just CVs to decoder

Only the CVs are imported into the decoder. As CVs and sounds are inextricably linked, this only works if this project has already been imported into the decoder, only a few settings (but no sounds) have been changed in the ZSP and these are now to be transferred to the decoder.

### 5.2...4 - Load CVs from decoder

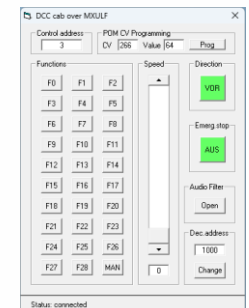
If changes have been made to the CVs in the locomotive after the sound has been recorded in the decoder, these can be read back into ZSP from the locomotive and saved in the project.

### 5.2...5 - Update decoder software

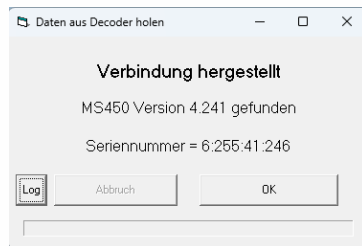
The decoder update tool is started with which new software versions for the decoder can be downloaded and programmed into the decoder.

### 5.2...6 - DCC cab over MXULF

You can start a software control panel via the MXULF and rail connection and pre-listen to the sound in the decoder.



### 5.2...7 - Typ abfragen



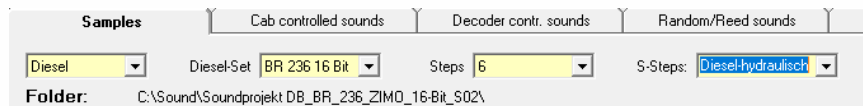
Checks which decoder is connected to the decoder update device. The serial number and software version of the decoder are also displayed. The serial number is required, for example, if a load code is to be requested from a sound provider. Alternatively, the serial number can be read from CV250 to CV253. MS decoder via SUSI, MX decoder via rail.

### 5.3 - Via USB stick with MXULF

To import a sound project into the decoder via USB stick, click on "Project" → "Save project as .zpp" in the menu and save the .zpp file to the USB stick.

ZSP is not required for encrypted projects. The .zpp file is downloaded from the Internet and saved directly to the USB stick. The serial number must be read from CV250 to CV253 and the load code must be saved in CV260 to CV263 before the sound project can be imported.

## 6 - Main window „Samples“



### 6.1 - Defining the basic parameters

#### 6.1...1 - Selecting the locomotive type (steam, diesel)

You can choose between the steam locomotive and diesel locomotive types, whereby electric locomotives are also defined as diesel locomotives.

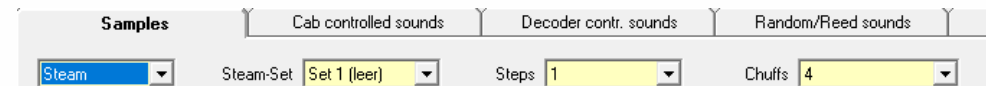
#### 6.1...2 - Selecting the steam/diesel set

Up to 32 locomotives can be defined per locomotive type. This can be used to create several variants of a sound project, which can then be switched via CV265 or during operation with a key that can be defined in CV345.

#### 6.1...3 - Set-name



The set can be renamed by clicking with the right mouse button in the yellow area of the sound sequence and selecting "Rename steam set" from the drop-down menu. This information can later be sent to a control panel via RailCom.



#### 6.1...4 - Number of speed steps for steam locomotives

Different samples can be used for different speed ranges. If more than one stage is used, the switchover thresholds must be specified. These specify the time in milliseconds that has elapsed between the triggering of the last two chuffs. If the time falls below the time defined in the switchover threshold (driving faster), the system switches to the sample to the right of the switchover threshold.

#### 6.1...5 - Number of steam strokes per wheel turn for steam locomotives

You can select 2, 4, 6, 8, 10, 12, 14 or 16 beats per wheel revolution. The same number of different samples must be available.

### 6.1...6 - Number of drive levels for diesel locomotives

The speed range of the locomotive can be divided into up to 10 levels. 3 samples are required for each stage. In each case, 2 transition samples to the level below and one sample for the drive level itself.

### 6.1...7 - Sub-type of diesel locomotive

With "s-steps", the type of diesel locomotive can be specified more precisely.

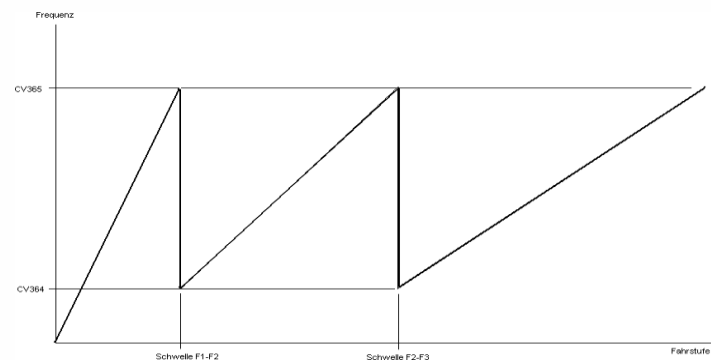
- Diesel-hydraulic: Selection of the sound sample depends on the target speed (speed set on the control panel)
- Diesel-electric: choice of sound sample depends on current driving speed
- Diesel-mechanical: Special sequence for locomotives with mechanical transmission

## 6.2 - Realisation of a diesel-mechanical locomotive

### 6.2...1 - With fixed number of gears and synthetic speed boost

can be designed in 2 ways:

- Set to "Diesel-electric" to "S-steps"
- The "Start" sample includes starting the diesel engine
- Sample "Stop" includes switching off the diesel engine
- Sample "Stand" contains an approx. 2s long sample of the diesel engine idling
- Sample "S-F1" contains the sound of shifting into gear and moving off
- Samples "F1", "F2"... contain lowest speed of the diesel engine when driving
- Samples "F1-F2", "F2-F3"... contain the transition from F1, raised to the highest speed, to F2 at the lowest speed and possibly a shift noise, i.e. the upshift to the next gear.
- Samples „F2-F1“, „F3-F2“... can be realised in 2 ways:
- CV158 Bit1=0 here the motor brake is used for downshifting during braking. In this case, the sample must contain a gradient from low to high speed.
- CV158 Bit1=1 this switches to idle when braking. In this case, the sample can contain the same sound as "F2", possibly slightly shortened to improve the response time.
- Sample "F1-S" contains the transition from "F1" to "Stand"
- CV364 contains the speed to which the diesel engine falls back when upshifting gear
- CV365 contains the maximum speed to which the diesel engine revs up



### 6.2...2 - With real Acceleration noise

		Faktor	Threshold	Faktor	Threshold	Faktor	Threshold	Faktor
		0	40	0	80	0	120	0
Start	Schalt	Beschl	Schalt	Beschl	Schalt	Beschl	Schalt	Beschl
Stop	Stand	Motor	Abbruch	Abbruch	Abbruch	Abbruch	Abbruch	Abbruch
<input type="text" value="kein Limit"/>								

Attention: according to the current status (March 2024), this sequence is only possible with MX but not MS decoders.

This sequence has the advantage of the better sound of the diesel engine during acceleration. The disadvantage is that the number of gears depends on the length of the "Acceleration" samples and the acceleration value set in CV3. The following settings must be made.

- Set "Diesel-mechanical" for "S-steps"
- Samples "Start", "Stand" and "Stop" contain sounds as described before.
- Sample "Shift" contains a short sound (<1s) from engaging the gear.
- Sample "Beschl" contains a real recording of the locomotive's acceleration noise. The last 0.5s of the sample must have a fade-out. (volume goes towards 0)
- The "Faktor" value above the "Beschl" sample determines how quickly the "Motor" sample is artificially increased in frequency. The length of the "Beschl" sample in seconds \*3 should be used as a guide. If the transition from the Acceleration noise to the constant motor noise has a frequency jump, this can be corrected with this value.
- The "Motor" sample contains the constant driving noise of the motor at the lowest driving speed. It should be about 2s long and must be playable without cracking in the loop.
- The "Abort" sample contains the sound of the upshift gear and must have a fade-in (slow fade-in) in the first 0.5s. At the end, it must match the "Stand" sample.

### 6.3 - Adding new samples (.wav files) to the project

In the "Directory" list window, you can change to the project directory or a subdirectory thereof. (double-click)

In the "Files" list window, the samples (.WAV files) available on the hard disc in the directory set above are displayed.

To add a sample to the project, it must be selected with the left mouse button and then dragged into one of the windows provided for this purpose while holding down the left mouse button and dropped there.



### 6.3...1 - Adding chuff samples for steam locomotives

The 3 fields "H", "M" and "L" are available for each speed level. Samples must always be assigned to the "M" fields. The "H" and "L" fields are optional. If other samples are to be used during Acceleration, these can be assigned to the "H" fields. If samples are assigned to the "L" fields, these are played by the decoder during braking. If an "H" or "L" field is left empty, the samples from the "M" field are automatically used.

If a sample is assigned to a field, it changes colour from grey to green. H" and "L" fields that differ from the "M" field are displayed with additional colours.

The assigned file is then displayed in the "Chuffs:" fields. If the last character in the file name (before .wav) is a number from 1 to 8, this is taken as information about the number of chuffs per wheel revolution and the sample is assigned accordingly. If the file names of the different steam samples only differ in this number (e.g. Dampf\_1.wav, Dampf\_2.wav,...) then only the 1st sample needs to be assigned and the others follow automatically. If a sample has already been assigned to the location, it will be replaced by the new one. If you click with the left mouse button on one of the assignment fields (M1,M2,...), the currently assigned samples are displayed in the "Chuffs:" fields.

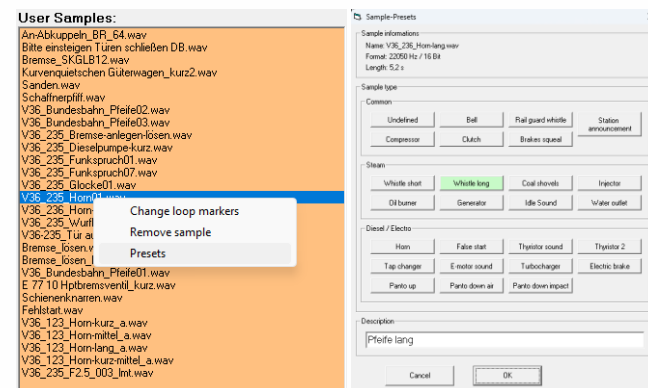
### 6.3...2 - Adding driving noise for diesel locomotives

- Field „Start“: Starting noise of the engine
- Field „Stand“: Stationary noise of the diesel engine
- Field „Stop“: Switching off the diesel engine
- Field „S-F1“: Transition from stationary noise to the first drive level
- Field „F1“: Engine noise at the first drive level
- Field „F1-S“: Transition from the first drive level to stationary noise
- 3 additional samples are required for each additional drive level

### 6.3...3 - Adding startup and fan noises for electric locomotives

- Field „Start“: Startup of the electric locomotive
- Field „Stand“: Stationary noise of the electric locomotive
- Field „Stop“: Shutdown of the electric locomotive
- Field „S-F1“: Starting up the traction motor fans
- Field „F1“: Fan noise loop
- Field „F1-S“: Switching off the traction motor fans

### 6.3...4 - Adding additional driving noise



Right-click on a user sample - Presets or drag sample from Files to User Samples, this also opens the sample presets.

If required, the following driving noises must be assigned under "User Samples":

- Stationary noise for steam locomotives (also known as "simming")
- Break squeal
- Drain the cylinders
- Direction change sound
- Thyristor sound
- Electric motor sound
- Tap changer (switch gear) sound
- Turbocharger sound

In the "Sample properties" window that then opens, the appropriate "Class" must be selected. (except for change of direction sound) The "Info" field can be used freely.



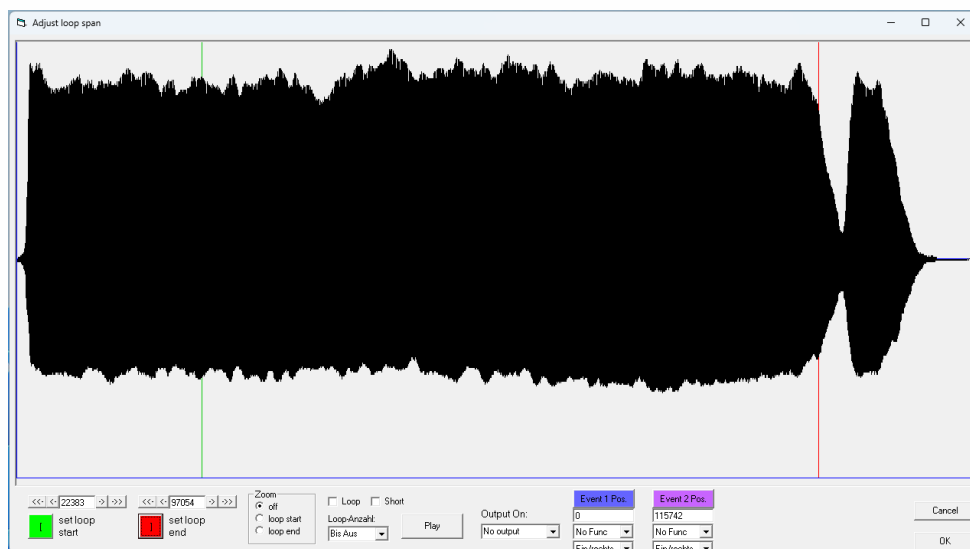
### 6.3...5 - Adding other sounds

All other sounds (whistles, compressor) are assigned to the "User Samples" window.

After assigning a new sound, a window opens in which the sample can be defined in more detail. It is not absolutely necessary to select a "class" for these samples, but it makes it easier to change a sound using the CV300 procedure (see decoder operating instructions).

The text entered in this "Info" field will later be used to send the name of the sound to a control panel via RailCom.

## 6.4 - Defining the loop points of a sample



Loop points must be defined for sounds that are to be played continuously (looped). An example would be a whistle that has a beginning part that is played once when the sound is switched on, a middle part that is played as long as the function key on the control panel is switched on and an end part that is played after the function key is switched off.

For the simming sound of steam locomotives, this can also be used to realise an up and shutdown.

To define the loop points for a sound assigned to the project (in the "User Samples" window), first select it with the left mouse button, then open the drop-down menu with the right mouse button and click on "change loop markers". The sound is now displayed graphically in the window that opens.

To define the start of the loop range, left-click on the desired position in the sound. A black line is then drawn. Now press the "set loop start" button and the line will turn green. The end of the loop area is set in the same way with the "set loop end" button and is coloured red.

If the sound is to be looped in the decoder, the "Loop" selection box must be ticked.

If you want the sound to jump forward immediately to the end marker when the function key is switched off, the "Short" selection box must be set. "Short" can also be used on its own in addition to Loop.

The "Play" button can be used to simulate the function key of a control panel so that the result can be checked immediately and also changed during playback.

The "Zoom" function can be used to place the start and end markers as close as possible to a zero crossing of the sound to prevent the sound from cracking.

### 6.4...1 - Assigning a function outputs to a sound

In the centre selection field, which normally contains "No Func", an output can be selected which is always switched on when this sound is being played. This output can be adjusted via CV. This can be used, for example, to switch on a red LED in the fire chamber whenever the coal shoveling sound is played. When the sound has finished playing, the output switches off.

For steam locomotives with pulsed smoke there is also the special function "Smoke fan" to select which causes more smoke to come out of the funnel when the "blower" sound is played.

You can also use Event 1 Pos. (purple) and Event 2 Pos. (purple) to set pointers from which the function outputs are switched on (off). When the sample is over, the function outputs switch off.

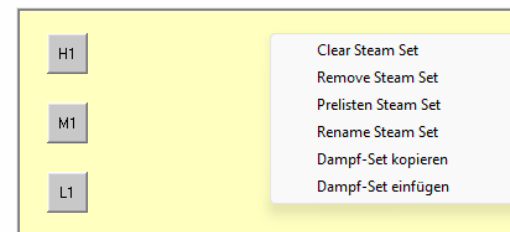
### 6.4...2 - Setting the "starting cloud" for diesel locomotives with smoke generator

Especially for large railway models of diesel locomotives in which smoke generators with fans are installed, it is possible to control the fan to generate a "start cloud". The start of this start cloud is defined by setting the "end of loop pointer". The fan motor is then controlled at full speed from this marker until the end of the sound sample.

## 6.5 - Removing a sample or steam/diesel set

To remove user samples, select them with the left mouse button, open the drop-down menu with the right mouse button and select "Remove sample".

Chuff samples cannot be deleted individually but can only be replaced by new ones. To delete the entire chuff set, right-click on the yellow area between the chuff fields and select "Delete chuff set" from the drop-down menu. With "Remove steam set", all subsequent steam sets are also moved up one place.





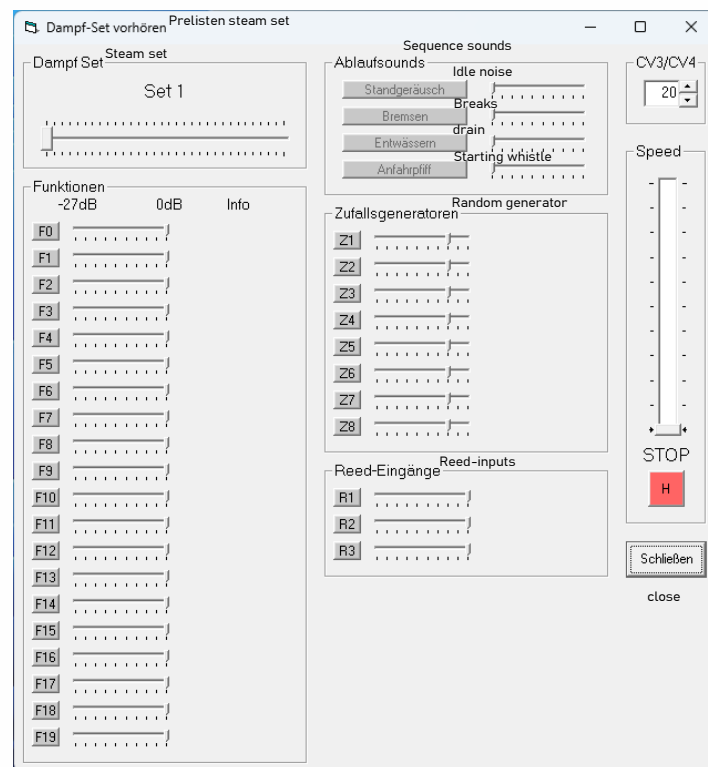
## 6.6 - Pre-listening to a steam or diesel set

Finished sets can be previewed on the PC. To do this, right-click on the yellow area between the steam or diesel fields and click on "Prelisten steam set" in the pop-up menu.

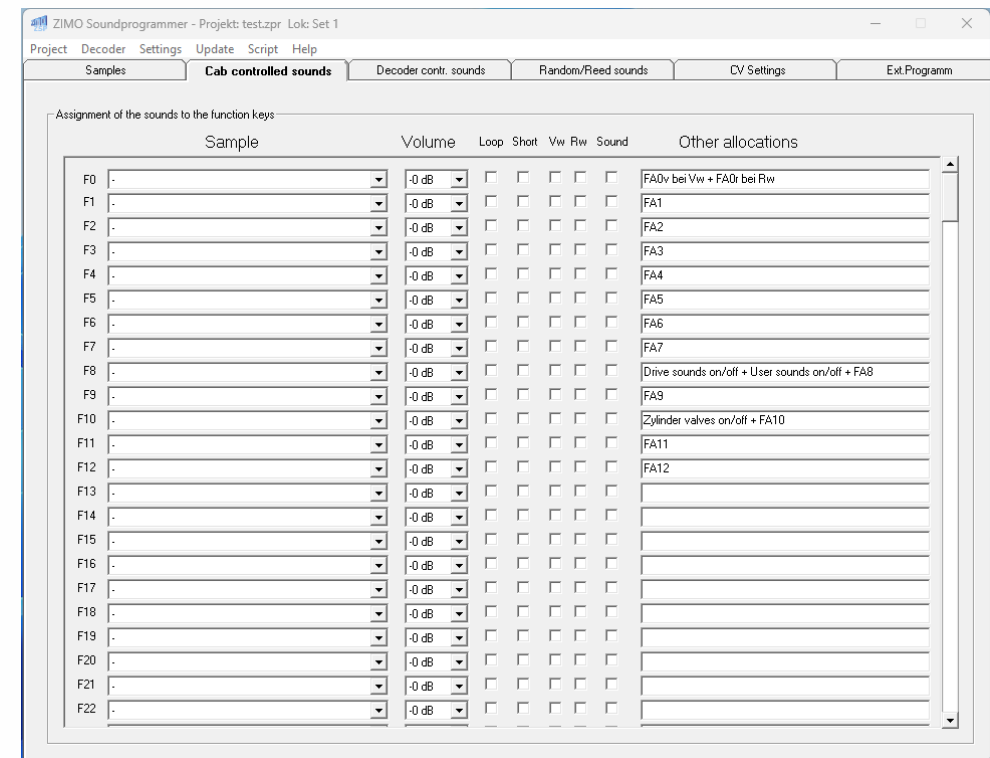
In the window that opens, you can select one of the 32 steam or diesel sets in the top left-hand corner and listen to it.

The volume of sounds that have already been assigned can be changed and the volume of the sounds can be synchronised.

Previewing the driving sound is currently only possible for steam sets.



## 7 - window „cab controlled sounds“



In this window, you can assign a sample to each of the function keys F0 to F28, define its volume and select whether the sound is looped (played endlessly) when the function key is pressed or shorted when the function key is switched off. In the info field you can see which function outputs have been assigned to which button and various other information. A tick in Vw (forwards) and Rw (backwards) means that the sound is only played in the selected direction.

Attention: If you have set loop markers immediately after dragging a sample from the files into the user samples (drag and drop), the check marks for Loop and Short are set automatically. However, if you set loop markers later (in the user samples by right-clicking "Select loop area"), these check marks are not set automatically. This must then be done manually if necessary.

## 8 - window „decoder contr. sounds“

### 8.1 - Assignment of decoder controlled sounds

All the sounds that are later controlled by the decoder must be assigned here. These include many driving noises and also the starting whistle.

#### 8.1...1 - Idle sound

Stationary noise of a steam locomotive. The sample should be at least 2s long and is played in an endless loop as long as the driving sound is switched on. To realise an up and shutdown, add these sounds to the front and back of the simming sound and then set the loop points correctly at the middle part.

#### 8.1...2 - Brakes squeal

Squealing noise of the wheels when braking. Sample may be longer than necessary as it is faded out when the vehicle comes to a standstill or when the brakes are no longer applied.

- CV287: Minimum drive level below which the squeaking occurs
- CV288: Minimum travel time after which the squeaking occurs

#### 8.1...3 - Water outlet

Automatic drain before driving away with adjustable minimum standing time. Optionally, draining can also be switched on and off manually using a button. If draining is activated while driving, the sound is modulated in time with the chuffs.

- CV272: Duration of the automatic drainage noise
- CV273: Start-up delay when drainage noise occurs
- CV274: Minimum standstill time for drainage noise to occur

#### 8.1...4 - Start Whistle

Automatic start-up whistle when driving away.

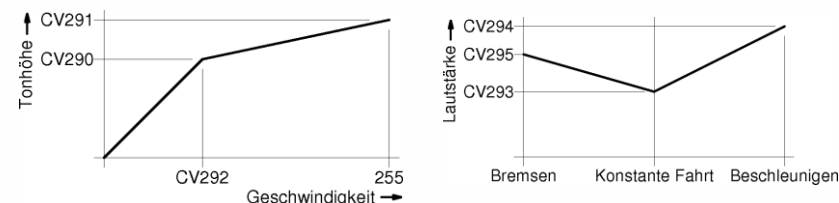
- CV274: Minimum standstill time for the start-up whistle to sound
- CV154 Bit7: 1 = Delay start-up until the start-up whistle has finished playing

#### 8.1...5 - Change direction

Is played when the direction of travel is changed.

#### 8.1...6 - Thyristor sound

This can be used to realise the Thyristor sound of an electric locomotive. The Thyristor sound must have the lowest frequency in the sample as the playback speed in the decoder is increased depending on the drive level. The sample should be at least 2s long and may have an introduction before the "start marker" of the "loop area" which is played once when the locomotive moves away (e.g. scale with Taurus locomotive). Of course, the sequence can also be used for other applications, e.g. a second diesel engine gauge that is only mixed with the other sound during acceleration to change the sound during acceleration.



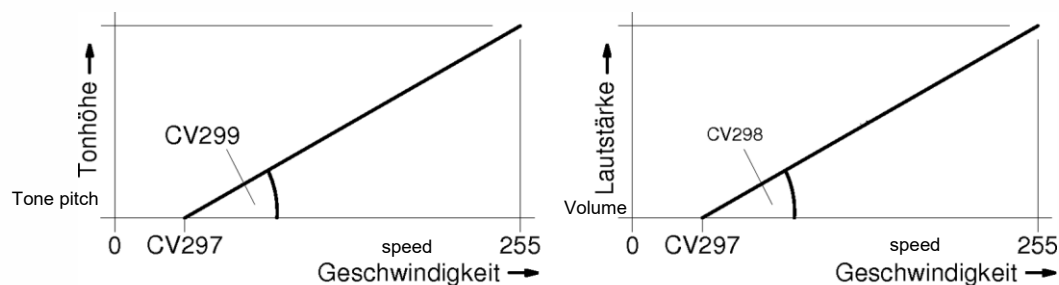
- CV289: Step effect when raising the pitch if value >1
- CV290: Pitch at speed set in CV292 (0-100)
- CV291: Pitch at max. speed (0-100, 100=double basic frequency)

- CV292: Speed at which the pitch rises to the value defined in CV290
- CV293: Volume at constant speed
- CV294: Acceleration volume
- CV295: Braking volume
- CV357: Drive level above which volume is reduced
- CV358: How quickly the volume is reduced if the speed exceeds the value set in CV357. (Values from 1-10 are useful, higher means faster fade-out)
- CV362: Speed above which another Thyristor sound is switched to. The second Thyristor sound is assigned to "Thyristor2".

### 8.1...7 - E-motor sound

This sequence is optimised to simulate an electric motor of an electric locomotive or diesel-electric locomotive.

- CV296: Volume of the electric motor noise
- CV297: Speed above which the electric motor becomes audible
- CV298: Increase in volume with increasing speed (1=slow, 255=fast)
- CV299: Slope of the frequency with increasing speed (0=none, 100=max. slope)
- CV372: Acceleration volume (0=no function, 1=min. 255=max.)
- CV373: Volume during braking (0=no function, 1=min. 255=max.)



### 8.1...8 - Tap changer

Sequence for simulating the Tap changer (switch gear) of an old electric locomotive. The sample should contain the sound of a gearshift.

- CV350: How long Tap changer (switch gear) does not come after moving away (useful if the first switching stage is already included in the "Stand->F1" sample)
- CV359: Time how long Tap changer (switch gear) sound is played in the loop [0.1s].

- CV360: Time how long Tap changer (switch gear) comes to a standstill [0.1s] (simulates resetting the electromotive brake, if present)
- CV361: Time until the sound is allowed to play again during acceleration after it has just been played. [0,1s]
- CV363: Number of switching steps over the speed range

### 8.1...9 - Thyristor 2

Description will follow.

### 8.1...10 - Turbocharger

This sequence is used to simulate the sound of a turbocharger on a diesel locomotive.

- CV366: Volume of the turbocharger sound
- CV367: Dependence of the frequency on the travelling speed
- CV368: Dependence of the frequency on the difference between the set and current drive level (acceleration/braking)
- CV369: Minimum load for the turbocharger to be audible at all
- CV370: How quickly the turbocharger increases the frequency
- CV371: How quickly the turbocharger reduces the frequency

### 8.1...11 - Electric brake

This sequence is used to simulate the sound of an electric brake. The sample should have a loop duration of at least 2 seconds. Furthermore, the sample may have a start part (before loop "set loop start") and an end part (after loop "set loop end").

- CV380: Function key for man. Switching on the sound of the "electric brake"
- CV381: Minimum drive level from which the sound can be heard
- CV382: Maximum drive level from which the sound can be heard
- CV383: Increase in frequency with increasing speed (0=none, 1-255=dependent on increasing speed)
- CV384: Number of drive levels by which deceleration is required to trigger the "Electric brake" sound
- CV385: Triggering on downhill travel (0=none, 1-255=trig. after negative motor load)
- CV386: Bit 0-2: Extension of the minimum runtime of the braking sound by 0-7 seconds so that the braking sound is not interrupted between drive levels. Bit 3 = 0 Sound is faded out at the end, Bit3 = 1 Sound ends with end sample

### Cornering squeal

Sound is only played during driving.  
For MS Decoder CV#307=128  
Key number for MS & MX Decoder: CV#308

## 8.2 - Selecting the F buttons with which the sound is controlled

Several buttons can be defined here with which, for example, the sound in the decoder can be switched on and off.

### 8.2...1 - „Drive sound On/Off“

Switching the driving sound on and off, (including startup and shutdown sounds). This also activates the random generators

### 8.2...2 - „User Sounds On/Off“

Set to "Always on" to be able to trigger sounds such as whistles even when the driving noise is switched off or to the same value as "Driving noise on/off" so that these sounds can only be triggered when the driving noise is switched on.

### 8.2...3 - „Cylinder valves On/Off“

There is a special sequence for steam locomotives that takes care of draining the cylinders. To use this, a sample with the class "cylinder cock" must be added to the "User Samples" and assigned to the "Drain" sequence sound. The drain is then triggered automatically when the vehicle is moved away or via the button that can be set here.

### 8.2...4 - „Mute On/Off“

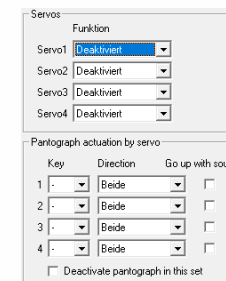
This button can be used to fade the entire sound in or out. CV314 can be used to set how quickly the sound is faded in or out.

## 8.3 - Configuring the servo outputs

Most ZIMO decoders have servo outputs. Large railway decoders have 4 outputs. The H0 decoders have 2 outputs which can be used as an alternative to Susi. The servos can be controlled via buttons or by internal special functions.

### 8.3...1 - Controlling pantographs via servos

Up to 4 servo outputs can be used to control pantographs. For example, output "Servo1" must be defined as the "Panto1" function and then a button and, if desired, the direction of travel must be set for "Pantographs" at Position1. If the "Go up with sound" option is activated, the pantograph moves up at the right moment for the "Start" sound (startup) and down again for the "Stop" sound (shutdown). When exactly within the sound the panto moves up or down is set under "change loop markers". To do this, right-click on "Start" or "Stop" and then click on "change loop markers". Now mark the point in the sound graphic where the panto should move up or down, click "set loop end" and exit the window with "OK".



Servos		
	Funktion	
Servo1	Deaktiviert	
Servo2	Deaktiviert	
Servo3	Deaktiviert	
Servo4	Deaktiviert	

Pantograph actuation by servo		
Key	Direction	Go up with sound
1	Beide	<input type="checkbox"/>
2	Beide	<input type="checkbox"/>
3	Beide	<input type="checkbox"/>
4	Beide	<input type="checkbox"/>

☐ Deactivate pantograph in this set

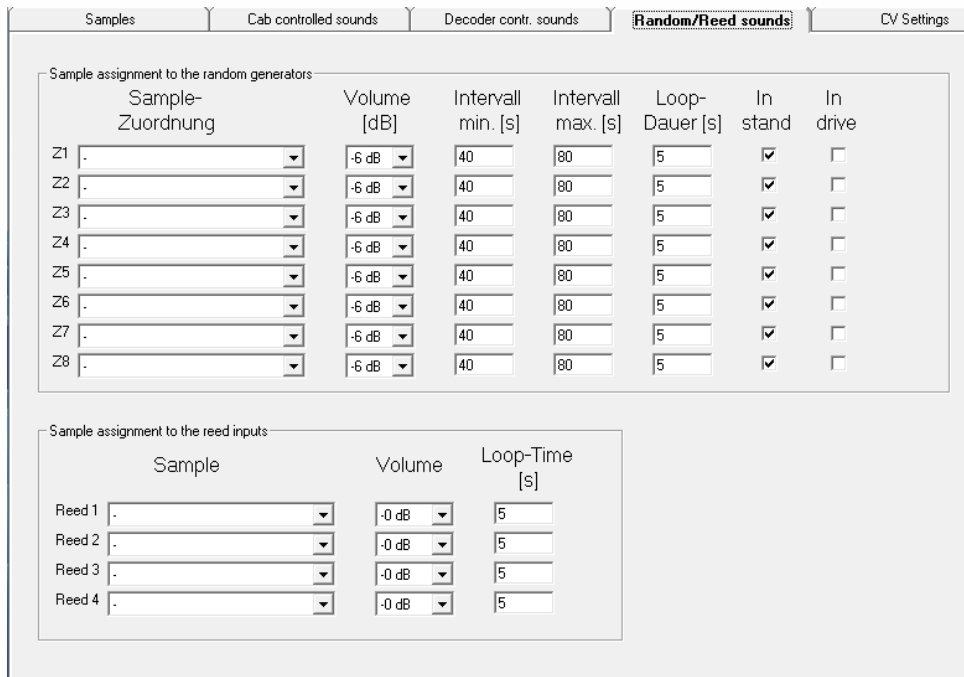
**Funktion** - Deaktiviert = disabled / Fahrrichtung = driving direction / Tür vorw. = door forwards / Tür rückw. = Door backwards / Fahrt/Stand = drive/stand

**Direction** - Beide = both / Nur Vw = only forward / Nur Rw = only backwards / Wenn Funk. Aus = if function is off

### 8.3...2 - Controlling pantographs via motors

The MX645 offers the option of controlling pantos via 2 motors. However, this function requires an external additional circuit on the loco board. This function is activated via CV154 Bit0=1. For further information please contact ZIMO.

## 9 - Window „Random/Reed sounds“



**Sample assignment to the random generators**

Sample-Zuordnung	Volume [dB]	Intervall min. [s]	Intervall max. [s]	Loop-Dauer [s]	In stand	In drive
Z1	-6 dB	40	80	5	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Z2	-6 dB	40	80	5	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Z3	-6 dB	40	80	5	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Z4	-6 dB	40	80	5	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Z5	-6 dB	40	80	5	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Z6	-6 dB	40	80	5	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Z7	-6 dB	40	80	5	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Z8	-6 dB	40	80	5	<input checked="" type="checkbox"/>	<input type="checkbox"/>

**Sample assignment to the reed inputs**

Sample	Volume	Loop-Time [s]
Reed 1	-0 dB	5
Reed 2	-0 dB	5
Reed 3	-0 dB	5
Reed 4	-0 dB	5

### 9.1 - Random generators

Up to 8 random generators are available here, each of which can be assigned a sample. Each random generator has additional parameters. These are volume, minimum interval, maximum interval, playback duration of the sound when it is triggered (at 0 it is only played once) and whether the sound is only triggered when driving, only when stationary or in both states.

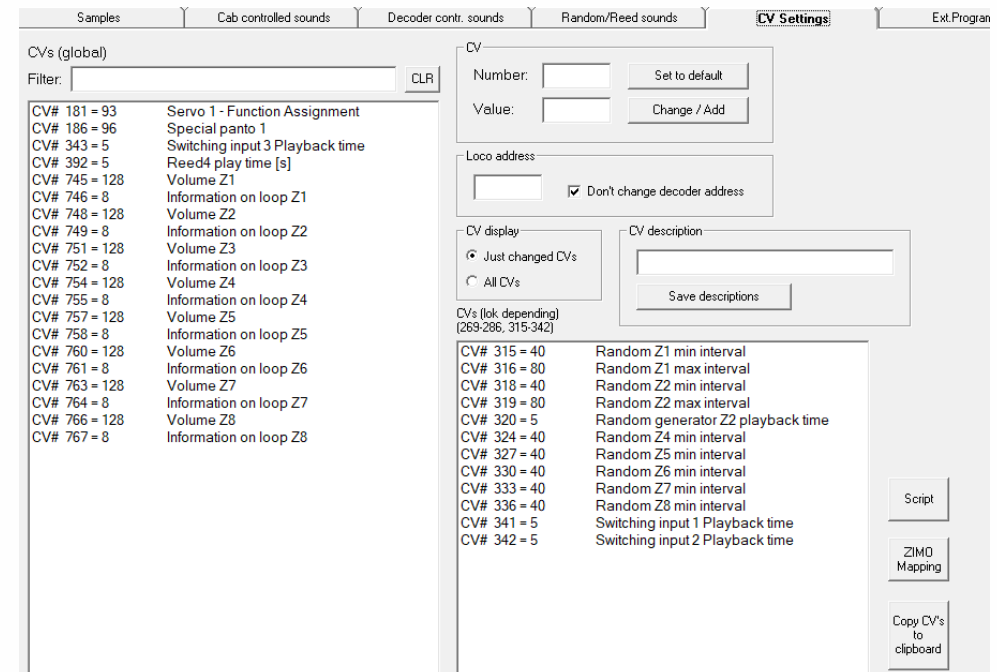
### 9.2 - Reed-inputs

The current large railway sound decoders have 3 inputs for reed switches. The current H0 sound decoders have one input. Sounds can be triggered with these inputs.

It should be noted that the highest reed input can always be used to trigger the wheel-synchronised chuffs (if CV268>0) and can then no longer be used to trigger any other sound.

## 10 - Window „CV Settings“

All functions that cannot yet be defined elsewhere in ZSP can be set here. The CV areas CV#269-286 and CV#315-342 can be defined individually for each locomotive, the remaining CVs are global and apply to all locomotives.



**CVs (global)**

Filter:  CLR

CV# 181 = 93	Servo 1 - Function Assignment
CV# 186 = 96	Special panto 1
CV# 343 = 5	Switching input 3 Playback time
CV# 392 = 5	Reed4 play time [s]
CV# 745 = 128	Volume Z1
CV# 746 = 8	Information on loop Z1
CV# 748 = 128	Volume Z2
CV# 749 = 8	Information on loop Z2
CV# 751 = 128	Volume Z3
CV# 752 = 8	Information on loop Z3
CV# 754 = 128	Volume Z4
CV# 755 = 8	Information on loop Z4
CV# 757 = 128	Volume Z5
CV# 758 = 8	Information on loop Z5
CV# 760 = 128	Volume Z6
CV# 761 = 8	Information on loop Z6
CV# 763 = 128	Volume Z7
CV# 764 = 8	Information on loop Z7
CV# 766 = 128	Volume Z8
CV# 767 = 8	Information on loop Z8

**CV**

Number:  Set to default

Value:  Change / Add

**Loco address**

☒ Don't change decoder address

**CV display**

☒ Just changed CVs

☐ All CVs

**CV description**

Save descriptions

**CVs (loco depending)**  
(269-286, 315-342)

CV# 315 = 40	Random Z1 min interval
CV# 316 = 80	Random Z1 max interval
CV# 318 = 40	Random Z2 min interval
CV# 319 = 80	Random Z2 max interval
CV# 320 = 5	Random generator Z2 playback time
CV# 324 = 40	Random Z4 min interval
CV# 327 = 40	Random Z5 min interval
CV# 330 = 40	Random Z6 min interval
CV# 333 = 40	Random Z7 min interval
CV# 336 = 40	Random Z8 min interval
CV# 341 = 5	Switching input 1 Playback time
CV# 342 = 5	Switching input 2 Playback time

Script

ZIMO Mapping

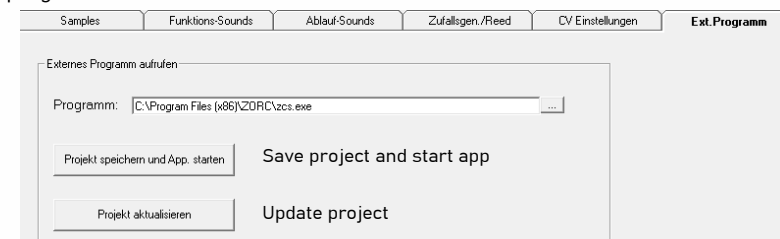
Copy CV's to clipboard

Configuring the CVs is easier with the "ZCS" tool from Matthias Manhart, which can be found at:

[ZCS - ZIMO CV Setting Tool](#)

Please refer to the [ONLINE help](#) listed there!

The CV settings relevant for a sound project can be found in the "Soundsetting configuration" tab. To be able to call up the ZCS tool from ZSP, its file path and name must be specified in ZSP under the "Ext. program" tab!



**Externes Programm aufrufen**

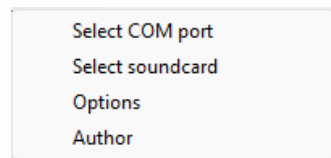
Programm:  C:\Program Files (x86)\ZORC\zcs.exe

Projekt speichern und App. starten Save project and start app

Projekt aktualisieren Update project

## 11 - Settings for ZSP

### 11.1 - Select COM port



Normally, the MXULF programming device should be recognised automatically by ZSP.

If the MXULF is displayed as not connected, it may be necessary to set the Com port manually. To do this, call up this option and select the MXULF in the list.

### 11.2 - Select soundcard

If several sound cards are installed in the system, the sound card can be changed here.

### 11.3 - Options

#### 11.3...1 - Load last project at startup

When the programme is started, the start screen is skipped and the last project used is loaded immediately. This also prevents the start screen from being called up automatically.

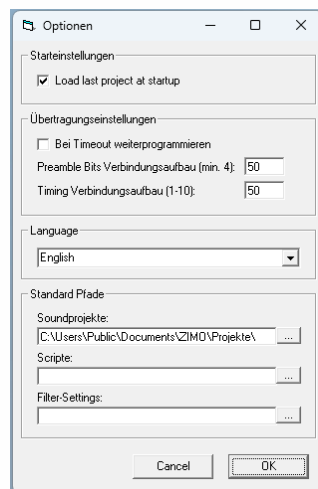
#### 11.3...2 - Bei Timeout weiterprogrammieren

This option can help with poor transmission ratios

#### 11.3...3 - Language

The languages available are German, English and French

Standard Pfade = Standard paths



### 11.4 - Online Update

The system checks whether a new version of ZSP is available (if there is an Internet connection) and downloads and installs it if required.



ZIMO Elektronik GmbH