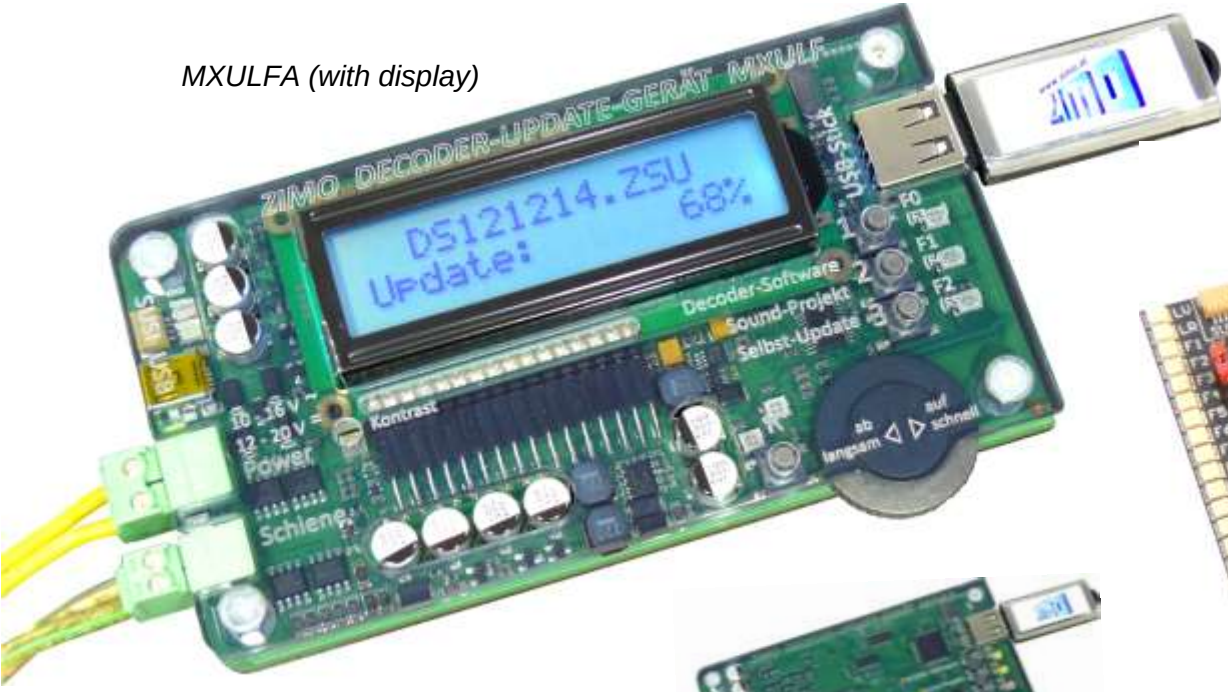
INSTRUCTION MANUAL

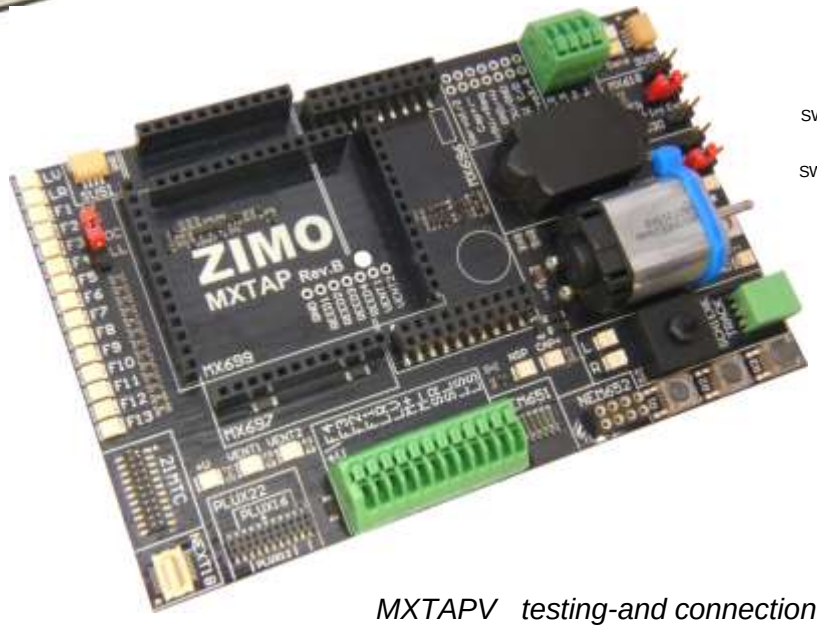
EDITIONS:

First delivery in December 2011 - 2011 12 20
until April 2012
SW add-on 2 — SW version 0.22 – 2012 11 10
SW add-on 3 — SW version 0.32 – 2012 12 20
SW add-on 4 — SW version 0.40 – 2013 03 12
SW add-on 5 — SW version 0.50 – 2013 08 20
0.56.03 - 2013 11 20
2014 03 13
Dortmund 2014 edition 2014 04 06
SW version 0.61 --- 2014 05 20
2014 10 10
2015 01 22
SW add-on 6 - 2015 07 05
2015 08 24
2015 11 25
2016 03 11
SW add-on 0.70 - 2016 08 01
2016 08 18
2016 09 01
SW version 0.85 - 2020 01 20
Addition MS - 2020 02 20
2020 06 01
2020 07 30

MXULFA (with display)



MXULF (without display), currently not available



MXTAPV testing-and connection board

Decoder Update and Sound loading device

MXULF and MXULFA (Software add-on 6)

*and: Test- and Connection Board **MXTAPS**, **MXTAPV***

1. MXULFA Features

Current features (April 2020):

- Software update from a flash drive for all ZIMO decoders and ZIMO sound decoders (of generations MX... and MS...)
- Loading sound projects from flash drive for all ZIMO sound decoders,
- Selection (by scrolling) of sound projects on the flash drive,
- Self-update of the MXULF, also from flash drive,
- MX decoders: automatic programming of the CVs necessary for updates (e.g. cancelling update locks in CV #144 or switching off analog operation) and resetting those CVs to the value they had before the update,
- Test operation for decoders or vehicles: Driving and (de-)activating functions of the vehicle on the update track via the operating elements of the MXULFA (scrolling wheel, buttons and LEDs). This way, the software update installed and the functionality of the loaded sound project can be tested.
- **SUSI sound loading**: via the SUSI plug on the MXULF, sound projects can be loaded a lot faster than the "normal" way: SUSI loading is recommended BEFORE installing the decoder in the train, especially if the decoder is equipped with an interface (PluX, MTC, Next, ...) and can therefore be plugged into the test- and connection board.

  MX decoders with 32 Mbit sound flash: Loading via SUSI takes about 4 minutes for a project that fills the memory, compared to 30 minutes via tracks.

  MS decoders with 128 Mbit sound flash: Loading via SUSI takes about 6 minutes for a project that fills the memory, compared to 150* minutes via tracks (*value 06.2020).
- Programming and reading out CVs in Service Mode, enter load code,
- Programming and reading out CVs in Operational Mode, feedback via RailCom

ATTENTION: limited reliability of Operational Mode due to errors of the MXULF-RailCom detectors in some situations; improvements planned by software updates.

- **Synchronous update** (loading software parallelly) for accessory decoders MX820, MX821
- Operation of MXULF via the USB device interface (alternative to flash drive). Software updates, sound loading, configuration of and testing decoders from the computer via programs like ZCS, PfuSch and TrainProgrammer enable comprehensive and comfortable possibilities to improve ZIMO decoders, also, and especially, for larger fleets.

2. Technical Data

Supply voltage at input "Power" .. **12 - 20 V DC** (power supply unit or rail current from digital command station) or 10 - 16 V AC (in case of problems: use DC!)

for software update and loading sound of large-scale decoders …….. …..…… **min. 16 V DC!**

Maximum supply on output "Schiene" (track) (stabilized to 12 V) ..... 2 A

Dimensions (L x W x H) ….. 125 x 65 x 12 mm

3. Operating elements of the MXULF/ MXULFA

MXULF and MXULFA are equipped with the same LEDs to display status and processes; the MXULFA additionally is equipped with a 2 x 16 characters display.

The LEDs on the MXULF are sufficient for simple updating and sound loading operations; for driving operation with switching functions, programming CVs, etc, the version with display, i.e. MXULFA is highly recommended.

Resuming graphics of the basic functions an LED displays:

Show supply after connecting a voltage to the input "Power"
(at first delivery and until software 3, not all display variations were implemented)

LED (Power) green: voltage ok, current not too high
red: overcurrent, turned off

Decoder on update track (output "Schiene") and show loading procedure
(at first delivery and until software 3, not all display variations were implemented)

LED (track) yellow: found and recognized decoder (i.e. read out type)
flashes green (same pace as LED 1 or 2): Update or sound loading in course
green: update or sound loading complete
flashes red (1:1) same pace as LED 1 or 2: update or sound loading failed

Show content and loading procedure of flash drive

LED 1 yellow: flash drive recognized, readable, decoder software container file available; after pressing **button 1**: flashes green: software update of decoder in course
green: update complete
flashes red: Update failed

LED 2 yellow: flash drive recognized, readable, decoder sound project available; after pressing **button 2**:
flashes green: sound is loaded into the deocder
green: sound loading complete
flashes red: sound loading failed

LED 3 flashes green-yellow-red (1:1:1): flash drive contains software for self-update of MXULF; after pressing **button 3**:
green: self-update of MXULF complete >> notes on self-update see next page!

press and hold **R-key** (3 sec): Opens **menu** (only visible on MXULFA; MXULF without control)
(in some software versions not all display variations are implemented completely)

Within the menu, operating states different to update and sound loading can be selected: MS Snd Laden, MS SW Update, MS SW PowCycle, UPDATE & SOUND, FAHR, OP PROG, OP PROG ID+LD, SERV PROG, SERV PR ID+LD, SYNC-UPDATE, SUSI SOUND Load, MXULF STATUS, SERV PROG CV8=8, RESET.

After the selection (scroll to LOCO) and start (press **R-key**) operating state **LOCO:**

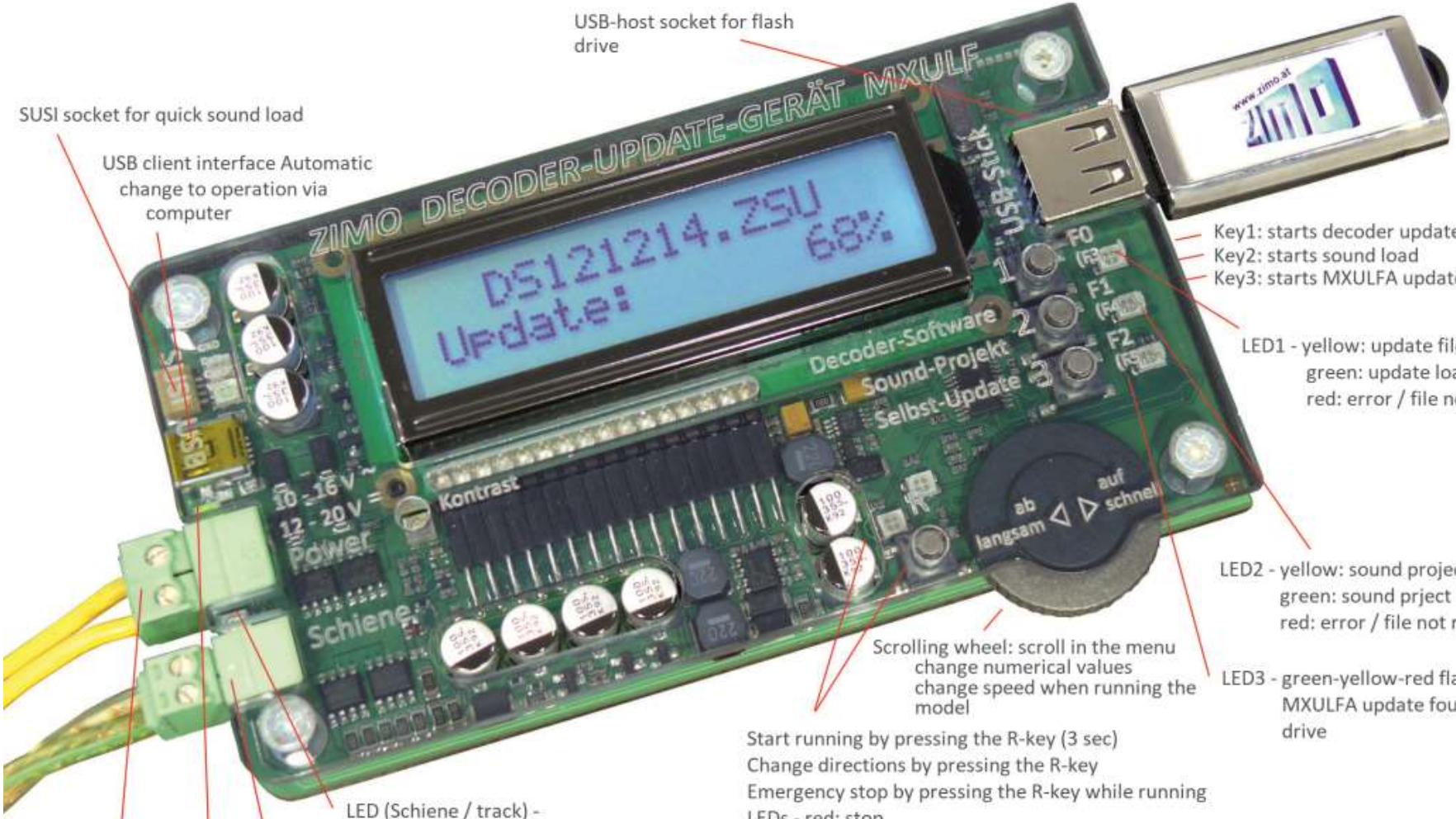
LEDs Forward, Reversed red: Direction of travel at standstill green: Direction of travel while cruising (speed step > 0)
flashes red (both LEDs): STOP (after pressing **R-key** while cruising)

Press **R-key** shortly at standstill: Change direction while cruising: STOP

Press and hold **R-key** **leave operating state LOCO!**

LEDs 1, 2, 3 Display of function states F0, F1, F2 (or groups F3 .. F5, F6 .. F8, etc.)

shortly press **buttons 1, 2, 3** switch functions press and hold switch group



USB-host socket for flash drive

SUSI socket for quick sound load

USB client interface Automatic change to operation via computer

Key1: starts decoder update
Key2: starts sound load
Key3: starts MXULFA update

LED1 - yellow: update file on flash drive
green: update loading / finished
red: error / file not readable

LED2 - yellow: sound project on flash drive
green: sound prject loading / finished
red: error / file not readable

LED3 - green-yellow-red flashing:
MXULFA update found on flash drive

Scrolling wheel: scroll in the menu
change numerical values
change speed when running the model

Start running by pressing the R-key (3 sec)
Change directions by pressing the R-key
Emergency stop by pressing the R-key while running
LEDs - red: stop
green: drive
green / red flashing: no feedback
red flashing: short circuit / no current

Power supply
(10 - 20 V = or ~

LED (power supply) -
green: OK
red: overcurrent

LED (Schiene / track) -
yellow: decoder found on track output
green: decoder update or sound load successfully completed
red flashing: error while updating / loading

Schiene / track: connection for updating, loading sound projects or running the decoder

Actuate function keys F0, F1, F2 by pressing the Key1, 2, 3 and display the function status with LED1, 2, 3
Switch to second level by pressing Key2 for 3 sec.
Actuate function keys F3, F4, F5 by pressing the Key1, 2, 3
Switch to third level by pressing Key3 for 3 sec.
Actuate function keys F6, F7, F8 by pressing the Key1, 2, 3

4. Self-update of the MXULF or MXULFA

The new software for the MXULF as .zip-file is downloaded from www.zimo.at under "Update & Sound" - "Update - Decoder update device MXULF". This .zip-file has to be unzipped (by double clicking it in Windows Explorer) or it is unzipped directly in the browser. This results in showing the actual update file (more specifically the two files MXULF.ulf and MXULF.bin; earlier only one file MXULF.bin).

The update files (.ulf and .bin) are saved into the root directory of a flash drive. You can use the flash drive provided by ZIMO, but also (almost) every other flash drive. There must not be other .ulf or .bin files than the current update files in the root directory (however, sound projects and decoder update files are no problem).

The actual self-updating process:

- Preparation: Disconnect all connections from the MXULF (power, track, USB, SUSI, flash drive, ...)
- Connect to power, i.e. 12 - 20 V DC (power supply unit or rail current from digital command station)
- Plug in the prepared flash drive. If update files .ulf and .bin are available on the flash drive: LED 3 flashes red-green-yellow
- Start the self-update with **Key 3** (press and hold)

Display of the MXULFA

Booting
WAIT …
CRC OK

Loading the update takes a few sec ….

LED 3 lights up green: Update is complete

- Confirmation with **Key 3** restarts the MXULF (alternative: power-off and restart by power-on).

"NOT-UPDATE" if software in MXULF is damaged: first, plug in flash drive, then power, update starts immediately (if the MXULF's bootloader identifies damaged software).
It also helps to format the flash drive. If possible, do not save other data in the flash drive's root directory.

NOTE: the term "MXULF" is used as general term for both versions:
MXULF and MXULFA.
Due to the constant development of the software of the MXULF, there are slight differences between instruction manual and actual behavior of the MXULF; especially the display pictures show previews of planned software versions.

5. Decoder software update

Via flash drive

The loco with the installed decoder is placed on the "update track" connected to the MXULF (output "Schiene" - track), or the decoder itself is connected to it with its track outputs - red and black wire.

NOTE: during the update and sound loading processes, the MXULF deactivates update locks within the decoder automatically (by programming CV #144 = 0) and turns off analog operation (CV #29, bit 2 = 0). After the update, the MXULF tries to reset the CVs to their original values.

In case, the MXULF is not able to reprogram CVs for any reason (note shown on display, e.g. decoder without consumer, and therefore no acknowledgement of the programming), it is possible to reprogram the decoder manually before the update with every digital system, by setting CV #144 = 0 and CV #29, bit 2 = 0.

The updating process (Starting point for description: MXULF disconnected):

- **Supply ("Power")** is connected: **Voltage sufficient → LED (Power) green.**

Display of the MXULFA

MXULF SW 0.22
VIN=18 Vout=11,8

Display of the software version loaded into the MXULF (of the MXULF itself, this has nothing to do with the decoder software);
as well as the supply voltage (planned) and the internally regulated output voltage (if possible, about 12 V). NOTE: these readings are performed with a completely load-free track output.

NOTE: the MXULF CANNOT determine, if the supply voltage is high enough or too high. Therefore, every supply voltage is regulated down to 12 V, so the connected decoder is not damaged (in case of identified large-scale decoders to 16 V if enough supply voltage is provided).

- **Flash drive** is connected:
  no usable files on the flash drive (root): LED 1, LED 2, and LED 3 remain dark,
  (only) **decoder SW container files** found → **LED 1 turns yellow**, LED 2 remains dark
  (only) **decoder sound projects** found → LED 1 remains dark, **LED 2 turns yellow**,
  container file and sound project found → **LEDs 1 and 2 turn yellow**
  software for the MXULF's self update found → **LED 3** flashes green-yellow-red

Display of the MXULFA

SW 121022.ZSU
Harzkamel-13.ZPP

Display of names of the decoder SW container file (.zsu) (and sound projects (.zpp) identified on the flash drive.

It is recommended to save only a single decoder update container file on the flash drive (i.e. in its root directory).
In case the flash drive was already plugged in when connecting the MXULF to power, first the voltages are displayed (top of the display), 5 seconds later the files are displayed.

- **MX Decoder** is connected: **as soon as decoder is identified → LED (track) turns yellow**

The MXULF does not recognize, if it is a decoder, it only reacts to power consumption.

Press **button 1** to start the update. The MXULFA display shows the progress of the update and the decoder type. LED 1 flashes green. The process is completed by showing "UPDATE OK CV 29 & 144 OK". LED 1 remains green.

To return to main display: press **Key 1**. After a few seconds, the MXULF is ready for a new update. Unplug the flash drive if this is not wanted.

In case of more than one update file on the flash drive, only the first file is shown in the list. To select one of the other files, open the MXULFA's menu by pressing the **R-key** (3 sec) and select "UPDATE & SOUND" using the scrolling wheel. The list of update and sound files appears. Select the appropriate file with the scrolling wheel and start the update by pressing the **R-key**. The following procedure is described above.

- **MS Decoder** is connected: **as soon as decoder is identified → LED (track) turns yellow**

- MS decoders with software higher than 4.08:

By pressing **Key 1** on the MXULF, the software update is started with the container file "MS_4.xx.zsu". The MXULFA display shows the progress of the update and the decoder type. The process is completed with the notification "OK 1 (1) ready -> R". LED 1 remains yellow.

To return to main display: Press the **R-key**. After a few seconds, the MXULF is ready for another update. Unplug the flash drive if this is not wanted.

In case of more than one MS-update file on the flash drive, only the first file is shown in the list. After pressing **Button 1** the MXULF automatically displays the list of update files on the flash drive. Select the appropriate file with the scrolling wheel and start the update by pressing **Button 1**. The following procedure is described above.

Updating a MS-decoder is also possible via the menu item “MS Software Update”.

- MS decoders with software lower than or equal to 4.08:

MS440 and MS450 decoders with a software lower than or equal to 4.08 can only be updated with a specific software for the corresponding decoder type. This software is "MS440C_4.xx.zsu", "MS440D_4.xx.zsu" or “MS450_4.xx.zsu”, where xx describes the subversion of software 4.

The update is executed by scrolling through the MXULFA’s menu (press and hold **R-key** for 3 seconds) and select menu item “MS SW PowCycle”. After pressing the **R-key**, the update is started. The MXULFA display shows the progress of the update and the decoder type. The process is completed with the notification “OK 1 (1) ready -> R”. LED 1 remains yellow.

To return to main display: Press the **R-key**. After a few seconds, the MXULF is ready for a new update. Unplug the flash drive if this is not wanted.

- **Decoder of another manufacturer** is connected **as soon as decoder is identified → LED (track) turns yellow**

  Display of company name (ESU, ...) or “Hst xxx” (according to CV #8). Decoders of other manufacturers do NOT have SW subversions, but only the version according to CV #7. In those cases, software updates and sound loading is not possible.

In case first the decoder and then the flash drive are connected to the MXULF, first the decoder data and then the contents of the flash drive is displayed. Of course it is possible to display the contents of the flash drive after displaying the decoder data. Unplug and re-plug the flash drive.

- **Failure:** **→LED (1 or 2) flashes red.**

The MXULFA shows the failure of a software update on the display with:

- "Decoder not found": Connection to the decoder could not be established. If the decoder is connected to the MXULFA try again. It is also possible that the decoder is locked. Program CV #144 = 0

- no response -> R”: the MS decoder does not send feedback to the MXULFA. MX update files can be on the flash drive.

Via ZSP (ZIMO Sound Programmer)

It is also possible to update the software of a MX decoder with ZSP (ZIMO Sound Programmer) online. How to operate ZSP is described in the ZSP instruction manual:
http://www.zimo.at/web2010/documents/ZSP%20Bedienungsanleitung_V3.3.pdf

Currently (06.2020), this update process is not possible for MS decoders.

6. Decoder sound loading

Loading sound via SUSI interface

MXULF-SW 0.64.01 and higher, and decoder-SW 35.00

Loading sound to MX decoders takes about 3 - 4 min, to MS decoders about 5-6 minutes at full memory use. This concerns decoders with PluX, Next18 or MTC interfaces as well as large-scale decoders.

In this case, the large-scale decoder is connected via its own SUSI interface to the SUSI plug of the MXULF with the red SUSI cable; a “small decoder” (PluX, Next18 or MTC) is plugged into the MXTAPS/V with this interface and connected via the red SUSI cable to the MXULF. Several decoders can be connected in parallel.

NO further supply of the decoder (or decoders) is necessary; the connection “Schiene” (track) does not have to be connected (see description below).

Wired decoders: SUSI-interface on solder pad; see decoder instruction manual regarding positions.

Via flash drive

The sound file (.zpp) is in the root directory of the flash drive. It is plugged into the USB port of the MXULFA:

Display of the MXULFA

NO *.zsu File Harzkamel-13.zpp	if **decoder sound project** identified→ **LED 2 turns yellow** displaying the name of the sound project found on the flash drive. If there are more of the same sort, the newest is displayed.

To download via SUSI, open the MXULFA menu by pressing the **R-key** for 3 seconds. Select “ SUSI SOUND Load “ with the scrolling wheel and press the **R-key** to start loading.

NOTE: In case of older SW versions of the MXULF, the power supply and the flash drive have to be connected to the MXULF before the decoder is connected.

The MXULFA display shows the download progress and its completion with “SUSI 100%”. LED 2 remains green.

To return to main display: Press the **R-key**. After a few seconds, the MXULF is ready for a new loading procedure. Unplug the flash drive if this is not wanted.

In case there are more than one sound projects on the flash drive, they can be selected with the scrolling wheel and the **R-key**. Files of another type are irrelevant. If there are no sound files found on the flash drive, the MXULFA displays “No file Repeat -> R”.

If it fails, the display shows “Neustart-Fehler -> R” (Restart error -> R). Return to the menu by pressing the **R-key** on the MXULFA to repeat the process or restart the device. Sometimes it also helps to disconnect the MXULFA from power before starting a download or another operation.

Sometimes it is useful to disconnect the MXULFA from power before starting a download.

Via ZSP (ZIMO Sound Programmer)

It is also possible to download a sound project from the ZIMO ZSP software with an USB cable connecting PC / Laptop and the MXULFA.

The MXULFA is connected via an USB cable to the computer with ZSP (or ZPP Config) installed. The MXULFA always has to be connected to power, a flash drive must not be connected in this case. How to operate ZSP is described in the ZSP instruction manual:
http://www.zimo.at/web2010/documents/ZSP%20Bedienungsanleitung_V3.3.pdf

NOTE: when loading a sound project via SUSI onto a MS decoder, the LEDs LV and LR of the MXTAPS/V flash.

Loading sound via “tracks”

Downloading a sound project via a SUSI connection is sometimes not possible due to a missing interface. 6 or 8 pole (NEM 651, 652) decoders do not have SUSI contacts, so a sound project has to be downloaded via “track” pins/wires (red and black wires).

The decoder is connected to the MXTAPS/V, which is connected via the “Schiene” cable to the MXULF. Only one decoder can be connected. A large-scale decoder is connected directly to the MXTAPV.

Via flash drive

After preparing the MXULFA (power supply and connection to MXTAPS/V) and connecting the decoder, the flash drive with the sound project (.zpp) has to be plugged in. If the MXULFA found the sound file, LED 2 lights up yellow and the name of the .zpp-file is displayed.

The sound project is loaded automatically after pressing the **Key 2**.

The MXULFA display shows the uploading progress and its completion with “Fertig: 100% Reset -> R” (Complete: 100% Reset -> R). LED 2 remains yellow.

To return to main display: Press the **R-key**. After a few seconds, the MXULF is ready for a new loading procedure. Unplug the flash drive if this is not wanted.

If there is more than one sound project on the flash drive, they can be scrolled through with the scrolling wheel and selected with the **R-key**. If there are no sound files on the flash drive, the MXULFA display shows: " No *.zpp File Restart -> R".

Depending on the type of decoder (MX or MS) and the number of .zpp-files on the flash drive, the following possibilities are available:

More than one .zpp-sound file on the flash drive: press and hold (3 sec) the **R-key** to open the MXULFA menu, scroll and select on of the following menu items:

- "MS Load Sound": Loading a sound project onto a MS decoder.

- "UPDATE & SOUND": Loading a sound project onto a MX decoder.

The procedure is identical to the download described above, completion is displayed with “100%”. To return to main display: Press the **R-key**. After a few seconds, the MXULF is ready for a new loading procedure. Unplug the flash drive if this is not wanted.

7. Synchronous update for accessory decoders MX820, MX821

SW version 0.50 and higher

This method removes a problem especially known with large-scale layouts: decoders built-in to turnout casings (e.g. LGB) have to be removed and connected individually to a decoder-update-device to load an update.

Using the *synchronous update*, the decoders can stay on the layout, the decoder-update-device MXULF(A) is connected instead of the digital command station and sends the new software to all accessory decoders. Every single accessory decoder then has the possibility to request a repetition by negative acknowledgements, until all decoders have the update installed. Vehicles can usually stay on the tracks during this procedure.

ATTENTION: the MXULF(A), or the power supply connected, is limited in its efficiency. The current draw of connected consumers (including vehicles which are placed on the layout) as well as the in-rush-current at power-up can lead to a shut-down due to a short circuit.

```
  UPDATE & SOUND
  LOCO
▶ SYNC UPDATE
```

← **Menu after pressing and holding the R-key**
(display only shows 2 lines,
other lines can be reached by scrolling).
reach menu item SYNC UPDATE by scrolling,

```
  OP PROG
  OP PROG ID+LD
  SERV PROG
  SERV PR ID+LD
```

start by shortly pressing the **R-key**

First, all accessory decoders on the layout (suitable for the synchronous update) are located and its number is displayed, sorted by decoder family.

NOTE: the searching process can take up to 2 seconds per decoder.

This list of decoder families stays on the display during the whole updating procedure; every line shows the current procedures for the corresponding family.

First decoder family is searched for, found number is displayed → `MX820 SEARCH 3`

Search complete; marked to show that search is complete → `■ MX820 FOUND 7`

The next decoder family (MX821) is searched automatically →
```
■ MX820 FOUND 7
  MX821 SEARCH 2
```

Search finished →
```
■ MX820 FOUND 7
■ MX821 FOUND 5
```

I.e. all lines with a completed search are marked.

Starting updates: Shortly press R-key → Starts update for all families
or after 10 sec timeout → (also) starts update for all families
or scroll to a line and shortly press R-key
→ Starts software update for the selected decoder family
(all other marks are deleted)

Progress is shown → `■ MX820 SY-UP 68%`
(Mark flashes during the update, % rises) `■ MX821 FOUND 5`

Update complete (number, in brackets number FOUND) is displayed → `MX820 OK 6( 7)`
(Mark is deleted only in the corresponding line) `■ MX821 FOUND 7`

press and hold **R-key**: Exits the synchronous update, returns to menu.

8. Driving operation with MXULFA

The MXULFA is also a small command station with max. 2A. This is enough to make test drives after sound loading or programming CVs. You can only drive with the MXULFA (version with display).

Operation	*Display on Display (EXAMPLES)*
... after powering on the MXULFA → Display of track voltage (limited to about 12 V)	`MXULF,E SW 0.22` `11.6 Vout`

Menu after pressing and holding the R-key (3 sec)

Menu item LOCO either pre-selected or reached by scrolling to LOCO, selection by pressing the **R-key**

```
  back
▶ LOCO
  OP PROG
  OP PROG ID+LD
```

After selection by R-key, driving operation is prepared →
Address and important CVs (# 1,29,17,18,7,8, ...) are read

```
  LOCO  read CVs
CV  18 =   184
```

Sound and lighting is activated automatically after reading CV values.

Address, type (e.g. MX645), SW version are displayed →

```
LOCO     Adr  3217
MX645    SW 32.00
```

or (non-ZIMO) name of Manufacturer ID or: value of CV #8 →
(at third-party manufacturers only CV #7 is shown as SW version)

```
LOCO     Adr  3217
xxx    SW 32
```

Hst

or (if it cannot be read-out)

```
LOCO reading CV
     not possible
```

Move speed regulator (**scrolling wheel**) or direction key →

```
before 57  Adr 3217
F0, F1, F2  =  1,1,0
```

Permanently displayed: Direction of travel (For, Rev), speed step, current function-trio F0, F1, F2; those functions are activated with buttons 1, 2, 3 (press and HOLD button 2 or 3: Switch to F3, F4, F5 or F6, F7, F8)

direction key while driving (=fast stop) →

```
STOPP
F6, F7, F8  =  0,0,1
```

direction key at standstill (=change of direction) →

```
Rev  0     Adr 3217
F0, F1, F2  =  1,1,0
```

Press and HOLD button 1, 2 or 3: switch function-trio →
to each F0, F1, F2 or. F3, F4, F5 or. F6, F7, F8 e.g.: key 2

```
Rev  0     Adr 3217
F3, F4, F5  =  0,0,0
```

press and hold **R-key**: Exits the driving operation, returns to menu.

9. Programming/ reading CVs *SERV PROG / OP PROG*

The MXULFA not only is a module too update ZIMO decoders, but also to read-out and program CVs. The MXULFA provides two ways of communication with the decoder:

- **PROG**ramming on the **SERV**ice track: the decoder connected to “Schiene” responds with motor pulses to requests by the MXULFA. This method is slow, but in many cases effective.

- **OP**erational **PORG**ramming: more than one decoder can be connected to “Schiene”, but only the decoder selected by its address will respond to the MXULFA’s request. This method is also called PoM (Programming on the Main).

To activate one of the programming modes, press and hold the **R-key** (3 sec) to open the menu, scroll to “SERV PROG” or “OP PROG” and press the **R-key** to change to the programming method.

SERV PROG

```
SERV PROG
CV
```

After selection by **R-key:** Wait to enter CV number

```
SERV PROG
CV 122 =
```

enter CV number with scrolling wheel, **R-key**

```
SERV PROG
CV 122 =136  ACK
```

enter CV value with scrolling wheel, **R-key**, ack. by motor current-Feedback by sending „ACK“

```
SERV PROG
CV 122 =136 NACK
```

enter CV value with scrolling wheel, but programming failed, therefore „NACK“

```
SERV PROG
CV 122 =   0 READ
```

or again **R-key** to read out, value is displayed with “READ“

```
SERV PROG
CV 122 =        N-RD
```

or again **R-key** to read out, but doesn’t work feedback „N-RD“ (= „No Read“).

```
CV 122 =136   ACK
CV
```

program or read further CVs
“old” line moves up

```
CV 122 =136   ACK
CV 123 =
```

Press and hold **R-key**: return to menu.

OP PROG

```
OP PROG
Address =  0
track / output
```

After selection by **R-key**: Wait to enter address (with scrolling wheel). It is possible to have more than one decoder on the (programming)

“Schiene”, only the one addressed is talked to.

```
OP PROG
CV 122 = 136   ACK
```

Further procedures like in SERV PROG, but faster, with the same feedback (ACK, NACK, READ, N-RD), and additionally „SENT“ (i.e. CV programming complete but not acknowledged).

10. Read / program load code

The load code for sound projects is one of ZIMOs specialties, which originates in a number of sound providers. They produce sound projects for ZIMO sound decoders. To load these sound projects onto a decoder, you have to buy a “load code”. This not only depends on the sound project’s author, but also on the identification number of the decoder.

It is a simple process:

- Read out the decoder ID: CV values #250, 251, 252 and 253.

- Buy a load code (ZIMO homepage, retailer, sound project’s author): 4 three-digit numbers.

Program these values into CVs #260, 261, 262 and 263.

- Load the sound project into the decoder (see chapter 6).

To read and program the necessary values, the MXULFA provides the possibilities already known from chapter 9 “read and program CVs”: "PR SERV ID+LD" or "PROG OP ID+LD".

Entering one of the programming modes via the menu: press and hold the **R-key** (3 sec) and select "SERV PR ID+LD" or "OP PR ID+LD" with the scrolling wheel.

SERV PR ID+LD

SERV PROG ID = 221, 56,242,102	After selection by **R-key** decoder ID is read out and displayed (CVs 250-253)
SERV PROG ID = NO-READ	or: After selection by R-key, decoder ID is read out, doesn't work
SERV PROG LC =	Press and hold **R-key** again to enter load code (CVs 250-253)
SERV PROG LC = 196, 67, 23,	program values, continue/ exit with **R-key** (CVs 260-263)
196, 67, 23,244 LC READ	or: instead of entering, press **R-key** again to read out the load code
196, 67, 23,244 LC ACK	after last value, press **R-key** ACK = ACKnowledgement**,** load code is valid and accepted by the decoder
196, 67, 23,244 LC NACK	or: after last value, press **R-key**, doesn't work NACK = Not ACKnowledged; usually: Load code is not valid or does not correspond to the serial number
	Press and hold **R-key**: return to menu.

OP PR ID+LD

OP PROG Enter addr:	After selection by **R-key** the address is entered, by pressing the R-key the ID is read out automatically.

Otherwise, this procedure is identical (but faster) to the mode "SERV PR ID+LD" (see previous chapter).

11. Decoder-connection board MXTAPS / V

ZIMO decoder-test-and-connection boards are best used wit ***MXULF*** and ***MXULFA***, as well as ZIMO command stations (especially *MX10)*, but also with older ZIMO digital command stations and devices of other manufacturers.

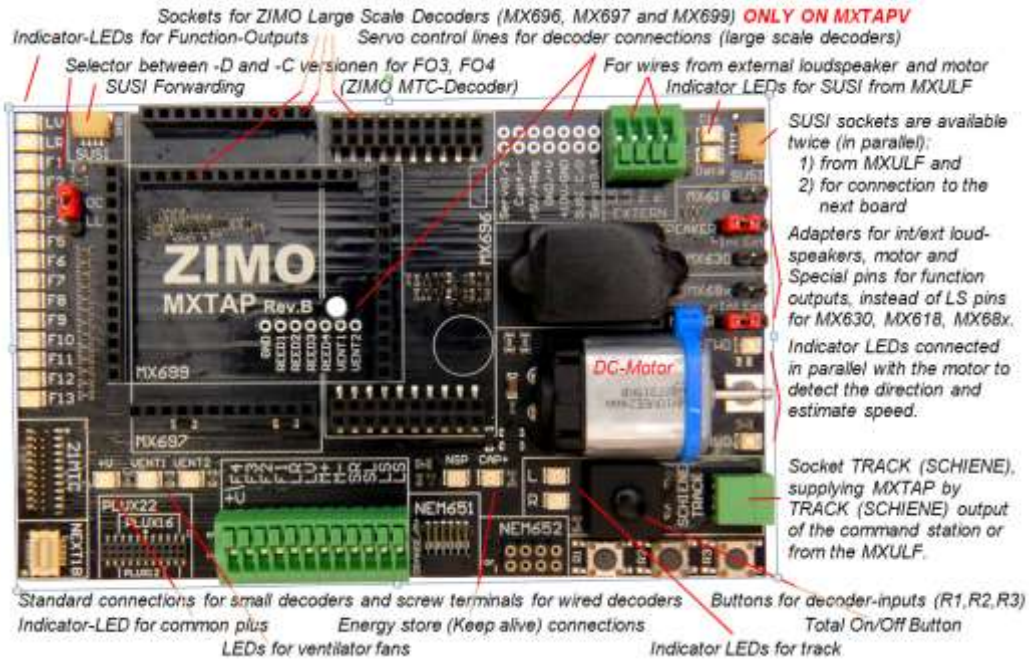
The basic features of these PCBs are the following:

- Plugs for all interfaces used in ZIMO decoders, i.e. PluX12, -16, -22, Next-18, 21MTC, NEM651, NEM652 (all standardized by VHDM or NMRA), as well as interfaces for large-scale decoders MX696, MX697, MX699 (proprietary of ZIMO).

  Two versions - ***MXTAPS*** only for small scales, ***MXTAPV*** with all interfaces (including large-scale)
- Connection to *MXULF*, ZIMO central command station or other digital command stations via double clamp "SCHIENE" and, if necessary (if available on counter device) via SUSI cable.
- To test the decoders, the following is provided: DC motor, speaker (1 Watt), various LEDs for function outputs and fan outputs (large-scale decoders), servo connections (large-scale decoders), plugs for various ZIMO decoder types and wires to external consumers.

NOTE: With the MXTAPS or MXTAPV, also decoders of other manufacturers can be used. To update software or sound, naturally, a suitable programming device of the corresponding manufacturer has to be used.
When testing, ZIMO and other products can be mixed on both sides.
SUSI sound load is only possible with ZIMO decoders.

Connections between the MXTAPV and the MXULF: a 2-pole cable to connect the "Schiene"-plug (track; connectors are supplied with the device) and a 4-pole SUSI cable (supplies; SUSIKAB).



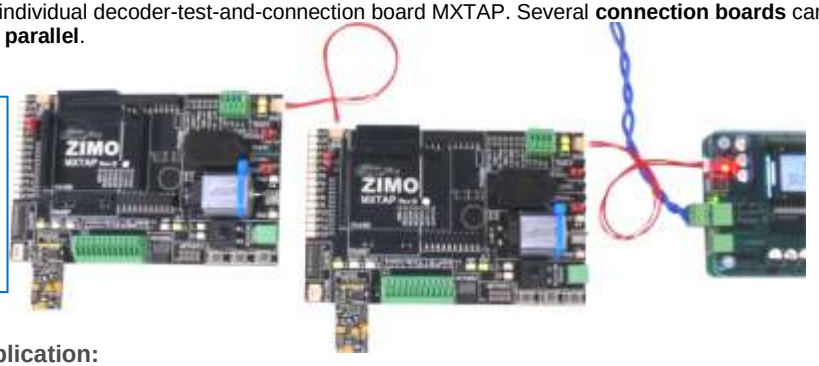
The ***MXTAPS*** (or ***MXTAPV***) is connected to the output "Schiene" of the *MXULF* via the double clamp "SCHIENE", and to a track output of a ZIMO central command station or another digital command station. No additional supply is necessary.

If needed, the SUSI plugs from *MXULF* and *MXTAP* are connected: via "SUSI", sound loading is essentially faster than via "tracks". For decoders with the interfaces "PluX", "MTC", "Next" as well as large-scale decoders, SUSI is automatically available at the "SUSI" interface of the ***MXTAP*** and can easily be transferred to the ***MXULF***.

ATTENTION: only ONE connection can be used. Therefore, you can NOT connect more than one decoder to the number of interfaces of the ***MXTAPS*** or ***MXTAPV***.
MX644 can **NOT** be loaded simultaneously!

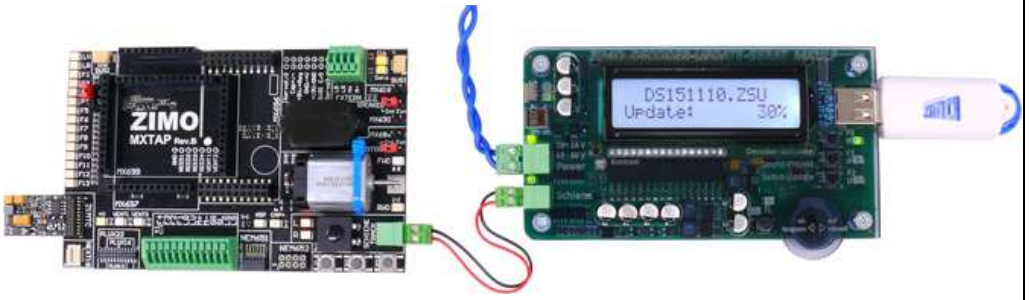
Simultaneous sound loading of more than one MX645P22 via "SUSI": each decoder has to be connected to an individual decoder-test-and-connection board MXTAP. Several **connection boards** can be connected **in parallel**.

NOTE: The supply via SUSI cable is sufficient for SUSI sound loading!

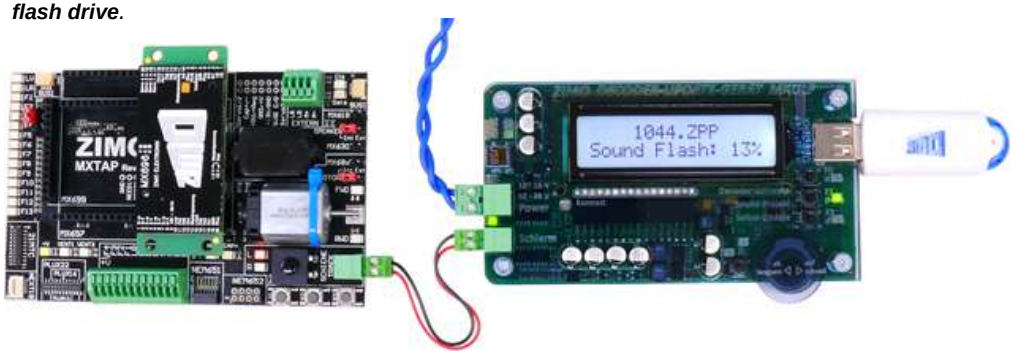


Typical application:

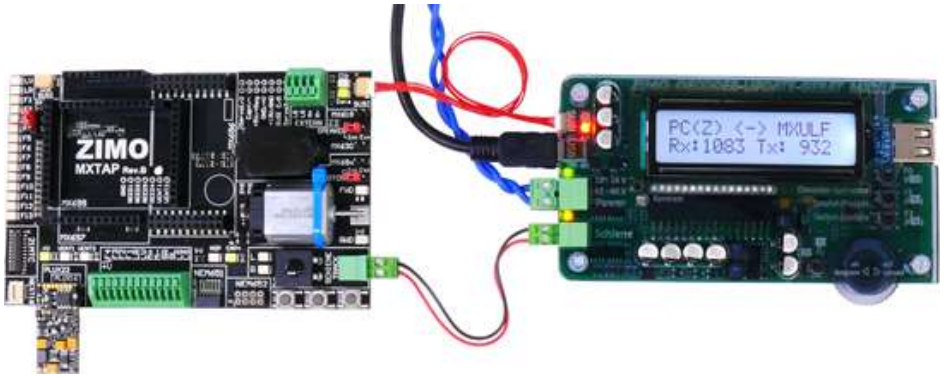
MXTAPV *with decoder MX644D (MTC interface), connected to* ***MXULFA****:*
Supply of the combination via connection "Power" on the MXULFA, 2-pole cable from "Schiene" (MXULFA) to "SCHIENE" (MXTAP); on the MXULFA, a ***decoder update*** *was just started (according to the display), the decoder software is loaded* ***from a flash drive****.*



MXTAPV *(not MXTAPS) with connected large-scale decoder MX696, connected to* ***MXULFA****; on the MXULFA* ***sound loading*** *was just started (according to the display), the sound project is loaded* ***from a flash drive****.*



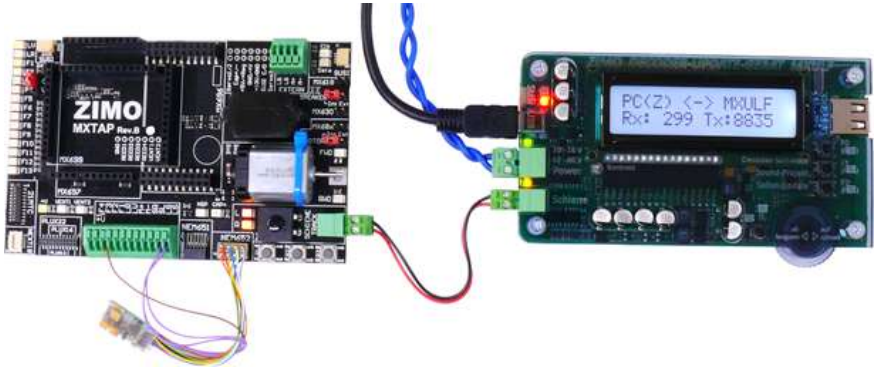
MXTAPV *with decoder MX645P22 (PluX22), connected to* ***MXULFA****:*
additionally ***SUSI*** *cable between MXULFA and MXTAPV, for* ***faster sound loading via SUSI****, MXULFA in this case is controlled* ***by computer*** *(usually software ZSP - ZIMO Sound Programmer; USB cable to the computer; on the display information to communication between PC and MXULF).*



MXTAPV *with decoder MX648N18 (Next), connected to* ***MXULFA****:*
Via operating elements and display of the MXULFA, ***test operation*** *is active, i.e. tests motor control, function outputs, sound of the decoder.*

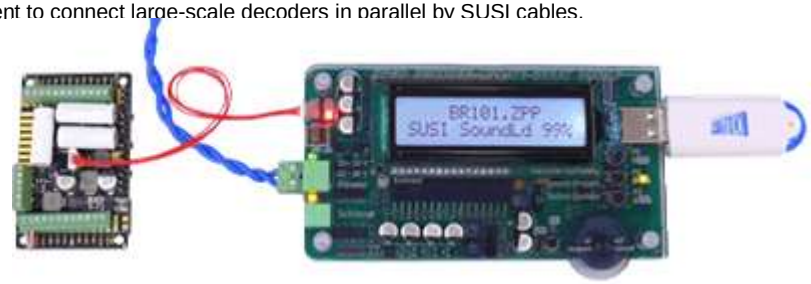
***MXTAPV** with decoder MX648R (8-pole NEM652 interface, speaker not on interface, therefore, wires on clamps), connected to **MXULFA**:*

*In this case, the **test operation** is controlled by the computer (display controller in ZSP or ZCS), therefore, on the display only information about communication between PC and MXULF.*



ATTENTION: To load sound into large-scale sound decoders, the SUSI interface ("SUSI" plug) on the decoder itself has to be used; it is NOT provided on the pin connectors of the decoder and therefore also NOT on the SUSI pins of the MXTAPV!

Therefore, it is not possible to load more than one large-scale decoder at the same time like "small" decoders (see previous page - with more than one MXTAPVs). Instead, it is possible to build your own equipment to connect large-scale decoders in parallel by SUSI cables.



12. Using the MXULF(A) with the computer

The USB (client) interface of the MXULF (MXULFA) can be used with two different protocols (for two different tasks):

1. for decoder software update and sound loading from the computer (software ZSP, ZCS, ZIRC); this can only be done with a special protocol, also used in MX31ZL, and

2. to configure (also program and read CVs) as well as driving from the computer via the "binary protocol", like it was used in the RS232-interface of the "old" central command station MX1" (generation MX1,, "compact", "multiprotocol", ...). This was tested with ZCS, PfuSch and TrainProgrammer.

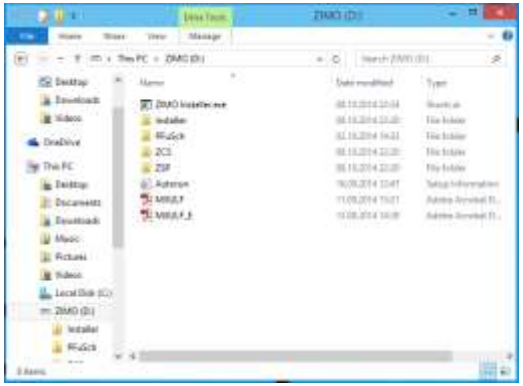
Installing a driver for MXULF and software from "MXULF flash drive"

Each MXULF is delivered with a "MXULF flash drive", which contains the MXULF driver and some software programs to update and configure ZIMO decoders.

NOTE: On the websites of ZIMO or other software providers you may find newer versions of the programs delivered on the flash drive!

Usually, it is not necessary to install the MXULF driver, because it is recognized by Windows like every other USB device.

The flash drive is connected to the compuiter and the directory opened (e.g. Windows Explorer), the contents appears: Screenshot ▶



Starting "ZIMO Installer.exe" by double click Screenshot ▼

Installing the MXULF driver via the first item on the window "MXULF flash drive", i.e. "install driver". The MXULF has to have a software version of 0.61.20 or higher.

ATTENTION with older Widows operating systems (XP or older): if the installer won't open, download a .net framewwork from Microsoft: http://www.microsoft.com/de-at/download/details.aspx?id=1639)

The window "MXULF USB Stick" shows, additionally to "Treiber installieren" (install driver), the programs on the flash drive, i.a. P.F.u.Sch. which can be installed if needed; and the instruction manual (.pdf-files).

◀ flash drive from October 2014.

If the MXULFA was purchased as "MXULFA-PF" (i.e. including the P.F.u.Sch. licence), P.F.u.Sch. shall be installed and started. In "Register-Information" you have to enter the code written on the inlay sheet.

Starting and connecting the MXULF to the computer

MXULF(A) is connected to power and then to the computer via an USB cable using the USB-client interface. Communication with Windows is started automatically; the MXULFA displays "PC <--> MXULF", the byte counter shows "0".

After the user software (see below) established contact, the bytes sent and received are counted; "Z" = ZSP protocol (used by ZSP) or "B" = Binary protocol for ZCS, P.F.u.Sch., TrainProgrammer and (future) other programs.

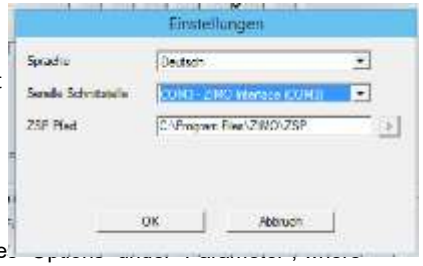
PC <-> MXULF
Rx: 0 Tx: 0

PC(Z) <-> MXULF
Rx: 264 Tx: 112

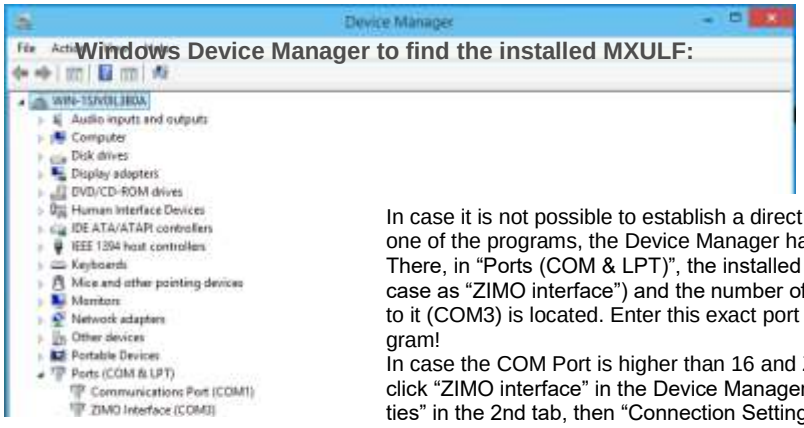
PC(B) <-> MXULF
Rx: 492 Tx: 8512

ZSP automatically locates the correct port (to which the MXULF was allocated by Windows at installation of the driver).

ZSC provides the window “Settings” in “?”, where, either ► suggested or in the drop-down menu, you select the COM Port with the corresponding reference (“ZIMO Interface”, “MX31ZL” or “MXULF”).

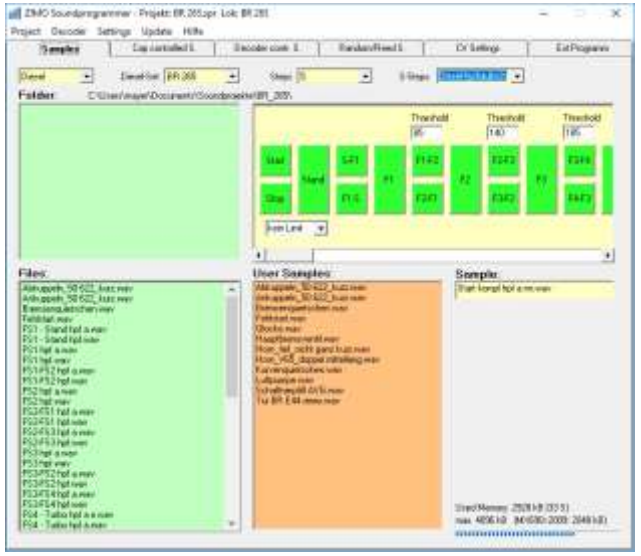


◄ P.F.u.Sch. provides [illegible] you can select the COM Port. Sometimes it is useful to use the Windows Device Manager, where the installed MXULF is located as “ZIMO interface”, “MX31ZL” or “MXULF” - see below.



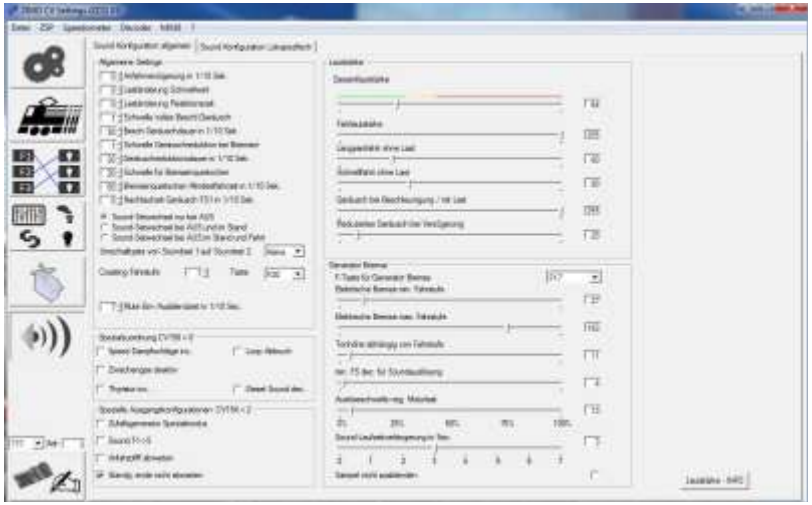
Windows Device Manager to find the installed MXULF:

In case it is not possible to establish a direct connection from one of the programs, the Device Manager has to be started. There, in “Ports (COM & LPT)”, the installed MXULF (in this case as “ZIMO interface”) and the number of the COM Port next to it (COM3) is located. Enter this exact port in the desired program!
In case the COM Port is higher than 16 and ZSP is used, right-click “ZIMO interface” in the Device Manager, select “Properties” in the 2nd tab, then “Connection Settings”, button “Extended”; in the lower part of the window appearing select a port number.

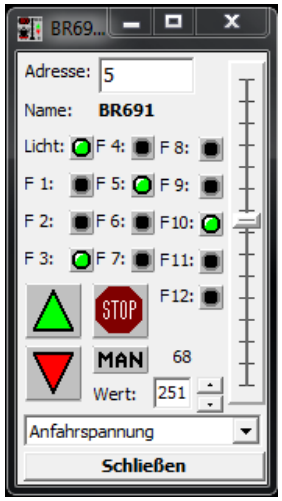


▲ *ZSP (creation of sound projects, decoder updating, sound loading)*:
in the picture above you see the display during the software update of a sound decoder MX645; MXULF is recognized as MX31ZL (because the MXULF behaves the same).

ZCS („ZIMO CV Setting“, by Matthias Manhart, http://www.beathis.ch/zcs/index.html):
Comfortable tool to configure the decoder with a number of tabs, especially to modify sound projects, but also to adjust them in real time, i.e. the parameters are effective directly during driving operation. ▼



Windows software to use MXULF(A), a selection



▲ *P.F.u.Sch.* („*Programmieren, Fahren und Schalten*“, (*programming, driving and switching*) by E. Sperrer, *info@stp-software.at*):programming CVs, computer controller to maneuver a locomotive,

Annex: Declaration of Conformity and Warranty

Declaration of Conformity:

ZIMO Elektronik GmbH hereby declares that the product MX10 bears the EC mark and is built in accordance with the provisions of Directives 88 / 378 / EWG ; 89 / 336 / EWG ; 73 / 23 / EWG.

24 months warranty:

Our products are technically sophisticated and are manufactured and tested with utmost care, therefore, ZIMO Elektronik GmbH guarantees its products for 24 months from the date of purchase (with proof of purchase from a ZIMO contractor).

The warranty covers the repair or replacement of defective parts. ZIMO Elektronik GmbH reserves the right to proceed at its own discretion only if the damage is proven to be the result of a design, manufacturing, material or transport fault. A repair does not extend the warranty. Warranty claims can be made with a ZIMO contract partner or ZIMO Elektronik GmbH. Proof of purchase is required.

The warranty does not apply:

- with normal wear and tear

- if devices are not used for the purpose intended by ZIMO Elektronik GmbH and in accordance with its operating instructions

- in case of modifications or alterations not performed by ZIMO Elektronik GmbH.

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