Newsletter March 2021

StayAlive!

This logo sounds like a motto for the current situation; nevertheless, it stands for the **ZIMO stay-alive technic**, and the products connected to it. There is some news in this regard.
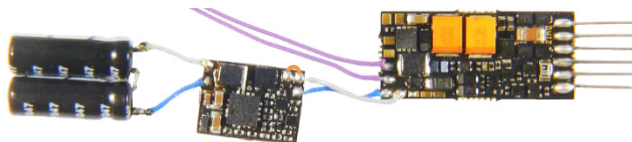
ZIMO does NOT build big and expensive powerpacks, but provides space-efficient, comparatively cheap but nonetheless very effective solutions. **Additional supply times** of **1 sec** or more can usually be achieved - with **STACO1** this is now also possible for **miniature decoders:**

STACO1 - the stay-alive controller
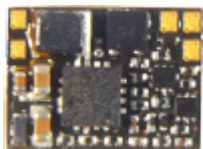
STACO1 prototype (picture enhanced 2:1)

STACO1 (middle) on a miniature sound decoder MS490N and 2 Mini Goldcaps connected in series (scale 1:1)

The wires between the components seem to disturb at first sight, but dividing the components spatially mostly enables the usage in the first place. STACO dimensions: 10 x 7.3 x 2 mm; Mini Goldcaps dimensions: 4 x 12 mm (d x h); it's a two-core connection.

The STACO1 is used with 3 Mini Goldcaps as actual stay-alive capacitors, which provide a capacity of **100.000 µF** if connected in series. Of course, at best all three are connected, but it also works (with about 50% runtime) with 2. The small STACO1-PCB contains a step-up voltage transformer, which drains the Goldcaps (8V with 3; 5.5V with 2) almost completely (2V) and provides a constant voltage of 10V. This is by far enough to continue driving after contact loss and to supply the sound amplifier (runs with 5V) without interruptions.

The price for STACO1 (including Goldcaps) is not yet definite, but will be **below 20 EUR** (i.e. half price of a power pack).

Generally, STACO1 can be used for every ZIMO decoder (MS and MX types); but it would NOT be useful for the "big ones of the small", i.e. the typical HO decoders: all variations of MS440 and MS450 (and later MS non-sound decoders) do have a "direct energy storage connection" which makes it even cheaper:

Direct connection of stay-alive-capacitors

This was an important feature of the MX generation for PluX22 and 21MTC sound decoders, but the **MS sound decoders MS440, MS450** (all variations, also the types with wires) enable the direct connection in **all possible capacities**. **Mini Goldcap modules** are the best addition to the decoders of this class.

Such prefabricated modules (50.000µF, 16V) are also available from ZIMO with a price **below 10 EUR**, when building it yourself (simple connection in series) already for **5 EUR**.
See www.zimo.at, decoders, energy storage.
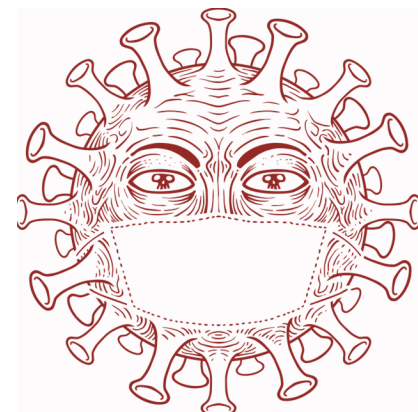
Free picture by Gordon Johnson on Pixabay

The third newsletter during Corona-driven times. Still, there are **no model railway exhibitions**. Nevertheless, a dense program is planned for autumn 2021: Leipzig, Vienna, Bauma, Dortmund (alternative date), Friedrichshafen.

A little replacement provide the ZIMO **workshops via video**, about 10 of them already took place. Shortly there will be one with the topic of the new **large-scale decoders**, especially the MS990, which will be the first delivered of the "larges", and at the same time will be the flagship of all ZIMO decoders.

Like always at this time we updated our **price list**, which contains the new product range, like the stay-alive components described on the left. It is valid starting mid-March and is available on our website. Unfortunately, a price augmentation was inevitable, about 3-5% with decoders, a little more than usual. At least the most important sound decoders (PluX22, 21MTC, Next18) still cost less than **100 EUR** (EIA).

This is due to the current semiconductor market. There are even talks that the automobile industry has to shorten production due to the **"chip crisis"**. ZIMO increased its stock already at the end of 2020, in the medium term no problems are expected.

Anti-Corona demonstration in front of the ZIMO house in ORF evening news on 13th, February

MSTAPK
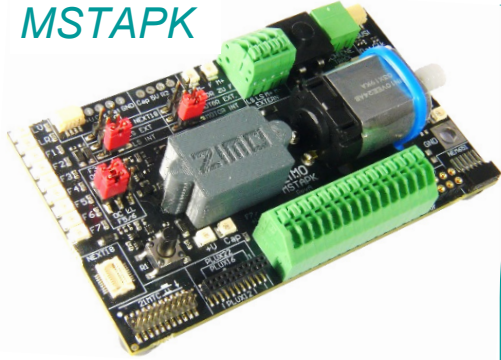
*The new test and connection board
to use with MXULFA for software updates,
sound loading and test operation
(or with a digital command station like the
central command station MX10)*

Compared to the *MXTAP* the new PCB provides more screw terminals (to FO7) for wired decoders and a **21MTC interface according to the standard** (for MS440C and -D), and of course **PluX22** and **Next18**. Additionally, especially for ZIMO decoders, there are LEDs to show the re-configured motor outputs.
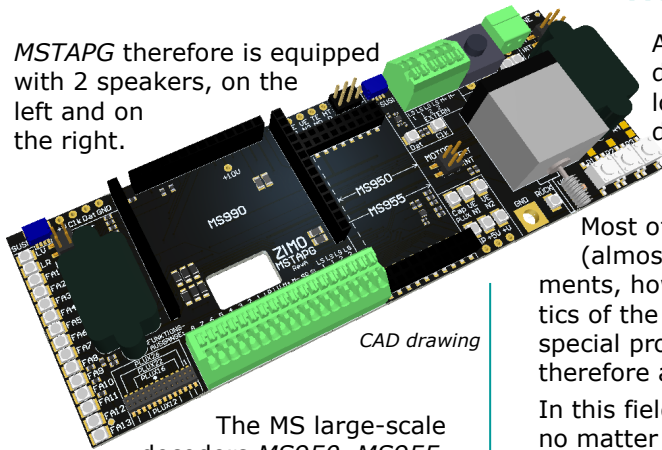
MXTAPK, contrary to MXTAPS, is only equipped (concerning interfaces) for **"small"** decoders (HO, N, TT).

MSTAPG
the stereo test board

All **MS large-scale decoders** are equipped with two independent sound outputs ("stereo").

MSTAPG therefore is equipped with 2 speakers, on the left and on the right.

CAD drawing

The MS large-scale decoders *MS950, MS955, MS990L* can be plugged in, like the *MS460P26* (with all its 26 pins), which is no large-scale decoder, but "stereo".

For decoders without pin connectors, the board is equipped with screw terminals, of course also a test monitor, control LEDs for the outputs, switches for inputs, etc.

Additionally, there are new special PCBs for the multi-update or -loading (MS decoders are designed especially for this feature), which is designed primarily for commercial use.

Sound decoder MS500
another step towards (sub-)miniaturization

The following months ZIMO not only releases a range of large-scale sound decoders (see newsletter November 2020 or homepage January/February of www.zimo.at). But also "in the other direction" we continue, namely with the **smallest ZIMO sound decoder so far**.

Like always, there are a **no limitations** to DCC characteristics, sound quality, etc. compared to larger types;
ATTENTION: MS500 is NOT mfx-able, like MS490, the smallest type up to now (now the second-smallest).

AT THE MOMENT there is only a CAD drawing of the MS500 PCB, but the first decoders will be produced shortly. Of course, there will be the usual variants, i.e. wired (also with NEM-652) and the N-variations (NEM-651) directly on the PCB.
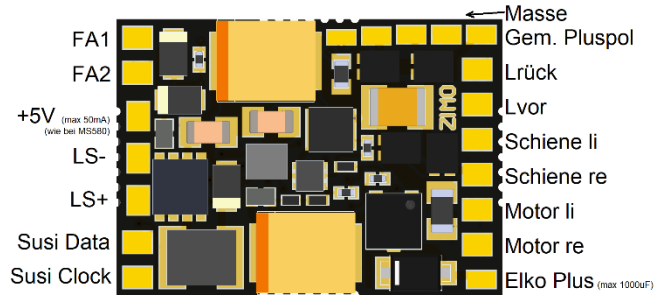
Dimensions:

14 x 10 x 2.6 mm

30 % smaller than MS490 (volume)

This means the sound decoder is only slightly bigger (1 mm wider) as the informal standard for N-*non*-sound decoders (14 x 9 mm) and therefore almost always fits in spaces designed for those.

The other technical data is identical to the MS490; naturally, the stay-alive controller STACO1 can be used with the MS550. Also see instruction manual "MS sound decoder".

MS - individual decoders

Additionally to the decoders available on the market, ZIMO produces special versions for defined models for a long time now following requests of model railway manufacturers. This is always done, if a decoder with standard interface (i.e. PluX22, PluX16, 21MTC or Next18) does not fit, sometimes also **due to special functional requirements.**

Most of the ZIMO individual decoders used by the model railway industry (almost 100% sound decoders) are still MX generation, new developments, however, already use the MS technology. The technical characteristics of the individual decoders are similar to the standard decoders (except special provisions); the "normal" instruction manual for CV settings etc. is therefore applicable.

In this field, too, the stay-alive components are more and more standard, no matter if Tantals (see below), electrolytic capacitors (ELKOs) or Goldcaps.

See below two examples of individual decoders and one individual loco PCB (middle, CAD) to which a standard decoder (in this case a PluX22 decoder like MS450P22) is plugged in.
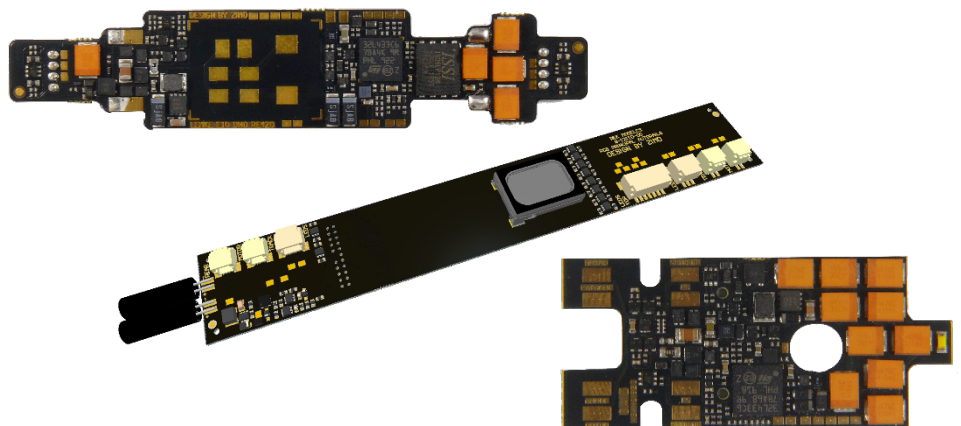
Software version 4.75 for MS decoders

(in rapid succession 4.77, 4.78, etc.)

Further steps to version 5.00, in which all MX features shall be realized (although, it is an asymptotic approximation, due to the fact that the MX decoders are still in development...:)

Additional to various bugfixes (therein, Service Mode Programming with Roco Z21 in 4.78) some additions have been made: direction dependency of function sounds, tilt-search, CVs #15, 16 according to standard, SUSI completion according to standard, Swiss Mapping - PWM group.

IMPORTANT: Please update the MXULFA to the latest version, so it corresponds to the MS decoders when updating or loading sound; this way it also corresponds to the description in the instruction manual for the MS decoders (chapter at the end).

Software version 40.2 for MX decoders

There is a number of add-ons and bug fixes (see www.zimo.at, Update & Sound, Update - MX decoders); many of them because of special requirements from sound providers. Especially the following are attractive for everyone:

- Backup of the CV settings changed by "pseudo programming" CV #8 = 254, reloading into the active CV set by CV #8 = 255.
- Programming and reading out SUSI CV (#897 and up) in OP MODE.
- Report of running voltage around the locomotive (display on MX32).

MX10 correction version 01.29.0100

Collaboration with new functions of ZCS (tool of Mathias Manhart, originally for "CV Setting"); display and possibility to switch signals (at the moment only German HV signals); corrections concerning radio operation (turn off, ...) and other bugfixes.

PS: We started working on the long awaited function to update decoders and load sound!

Outlook on StEin *(currently 7.1.81)*

In spite of continuously tried and mostly successful growth of the personal in software development (see last page), we still lack manpower. Due to this, the StEin's development does not proceed as fast as desired. Nevertheless, the StEins are used successfully on some big and very big layouts.

The StEin concept is a project, which exceeds - especially the implementation of subprojects not yet announced - the scope of other complete digital systems.

This is a summary of short- and midterm outlooks on StEin functions:

Important handling measures:

- Output of the "active configurations" to a flash drive, to control loading and activation processes (i.e. look, what is really written in the configuration sheet)
- Change to spreadsheet export to xml file to avoid errors in columns which produce "inexplicable" errors.

Functional add-ons (software):

- Further object classes: KONFBIB, ADDFERT (already described), three-way turnouts, decoupler. Completion of existing classes.
- Further ready-made configurations, especially signal systems.
- Enabling reading/writing parameters by the interlocking program.
- Complete implementation of "point following commands"

Add-ons (hardware):

- expansion board, especially for servo turnouts

Various bugfixes, especially of functions "Load into ALL modules".

16Bit

This symbol marks the lines in the ZIMO Sound Database which contain 16-bin sound projects.

At the end on February 2021 we counted 61 sound projects which use the main features of the new **MS decoders to its full extent**: 16-bit sound, doubled playback time and canal number (compared to MX).

Soon we will have **more than 100**. About half of the projects are free, the rest coded, i.e. made by external sound providers and fee-based.

working.

Nevertheless, there are more than **900 8-bit** sound projects, which have to be converted. This will take some time, because it is not possible to do this automated due to quality reasons. In some cases of early MX-projects there are no 16-bin recordings available or obtainable.

But via "witty" interpolation, the MS decoders can produce higher quality also from 8-bit sound projects - at least for the time being this is more than convenient.

mfx

This symbol in the ZIMO Sound Database shows that a vehicle with the corresponding sound project registers itself with all functions with the Märklin Stations.
It is a modified (lack of space) "Fits mfx" logo.

mfx-able sound projects are very rare until now: two projects at the end of February.

Still, many are in development and only wait for the integration of new function symbols from the Märklin Central Station to the ZIMO-owned allocation program.

In the medium-term, all 16-bin projects should be fully usable with mfx.

ZIMO SMD production line II

The ZIMO newsletter of November 2020 reported about the production machines, which were purchased and put into operation in the first half of 2020. SMD Placement machine, stencil printing machine with soldering paste, 3D-AOI machine (laser-supported <u>A</u>utomated <u>O</u>ptical <u>I</u>nspection).

The production capacity was increased by 50% by the replacement (with the same shift operation). At the end of 2020 it showed, nevertheless, that this is still not enough and could not prevent shortages in the Christmas business. The fastest solution was the reactivation of the "old" assembly machine, which was originally intended for sale as used device. After comprehensive maintenance and complementary investments, it was reinstated in January 2021. It is not the best for smallest components and most precise placement, but this does not affect the whole product range. Subminiature decoders like the MS500 are assembled on the new machine.

This (at least) **doubles** the **production capacity 2021** compared to the beginnings of 2020. In about two years, the "old" machine will probably be replaced by a second "new" machine (due to the discontinuance of replacement parts), which on the other hand entails further increase in performance.
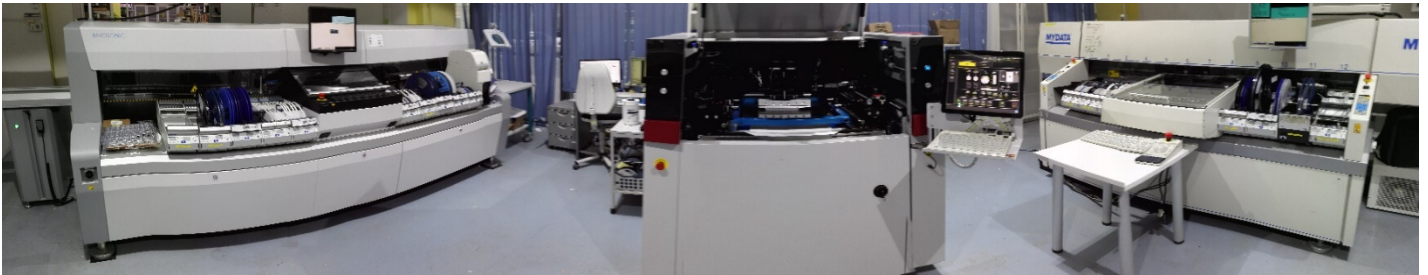

New SMD Placement machine   stencil printing machine with soldering paste   „Old" SMD Placement machine

Panorama view of the SMD production room on the ground floor of the ZIMO house (Schönbrunner Straße 188, 1120 Vienna). The recording technique (fish eye effect by "panorama scan") distorts the dimensions; in reality, the machines are set in a rectangle (about 9m x 6m): the stencil printing machine is situated along the anterior window wall, free space in the middle.
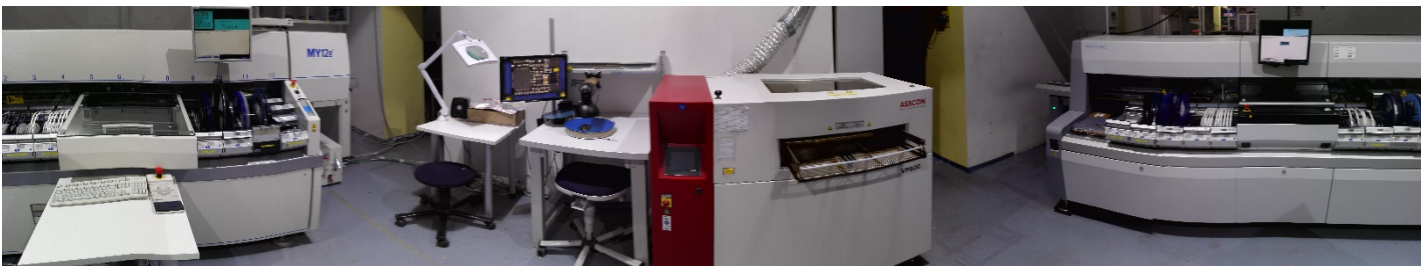

"Old" SMD Placement machine   vapour phase soldering oven   New SMD Placement machine

Panorama view in the other direction with the new vapour phase soldering oven in the center (in reality on the rear wall).

Since November 2020 (last Newsletter) a new, important element was added to the manufacturing layout: a **vapour phase soldering oven** (replaces the conveyer reflow oven). Vapour phase soldering is ideal for products like decoders (but also command stations, StEin, etc.), because the components are assembled on very tight spaces and provide different thermal masses (e.g. smallest resistors and "big" throttles); it is also of advantage for BGAs ("Ball Grid Arrays", i.e. ICs, e.g. microcontrollers or sound amplifiers - without pins, but with soldering balls on the bottom side which are invisible from the outside). Vapour phase soldering brings the defined soldering temperature on every space of the solder material (also below the BGAs, where there is no chance for an optical inspection) and physically mainly eliminates local overheating effects. The disadvantage often spread concerning the low flow rate is - regarding model railway products - not applicable, because the average component density is so high (and therefore, the overall PCB-surface relatively small) that even two fast assembly machines (like ZIMO uses) do not fill the soldering basket which enters the oven every 5 minutes.

New ZIMO employees *(after team display in the newsletter of April 2020)*
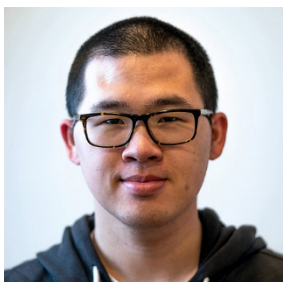
Tianwei Tang
Production,
SMD assembly with three
colleagues in shift operation
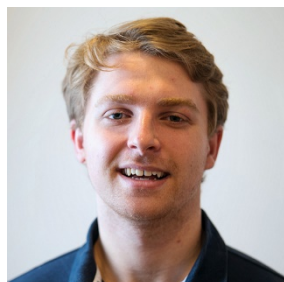
Alexander Veitch
Development,
software for the ZIMO
"Summer surprise egg"

Ling Na Pan
Sales & Administration,
accounting, magisterial
reporting system, shipment

Samuel Sillaber
Development
newest enhancement of the
MS group (currently MS990)