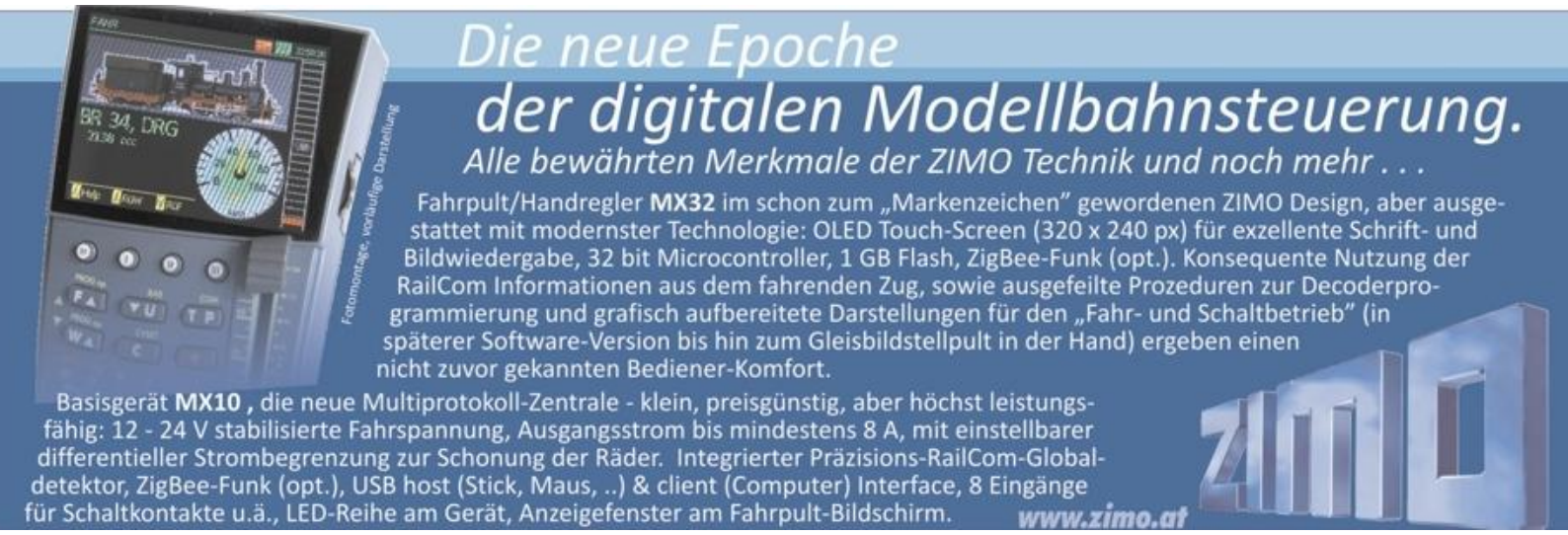

ZIMO Newsletter - DECEMBER 2009

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Please note that the text in the above image – an advertisement in European magazines with the title

The new era in model railroad control –

has not been translated, partly for technical reasons and partly because all the text appears with more detail below.

Not (as planned formerly) in this year (2009) . . .

The first examples of the new MX32 controller (CAB) have been produced in 2009, but are not yet released for sale, as they are all being used for internal and external development and testing.

In the early months of 2010, the long wait will be over, as first the MX32, then the "FuRC" (Radio and RailCom) modules for the MX1 will be released, followed by the MX10 base station.

Basics . . .

In basic concept and architecture (as well as in appearance), the new ZIMO system is not dissimilar from the previous version. At first glance, the base station is much smaller and the controller (CAB) has a much large display with full colour.

Nevertheless, these devices use completely new technology. Today, the much greater potential in available technology is used to provide more functionality and more usability for the railway modeller.

This is not to say that the existing ZIMO systems were not "state-of the art", but were rather the state at the turn of the millennium. This was certainly better than the technology of the 80s and 90s, but some manufacturers are starting tom offer more with new developments (typical characteristics are integrated circuits in dual-in-line housing, resistances with colour rings, red 7-segment displays,...), but it was no longer meeting the ZIMO high standards and not fair to ZIMO users, who expect more.

The technological leap from MX31 to MX32 (and MX1 to MX10) does not make the development work easy and there have been many setbacks and delays while sourcing the components.

Meanwhile, the ZIMO team has the technology under control and the ability to deliver is now within its grasp. The software in the first release to market will not be the final version and numerous new versions will follow, with update being possible via USB stick, i.e. updates do not require the direct connection of a computer, or even special software installed on the computer.

The "FuRC" (= Funk, or Radio, and RailCom*) - Module for upgrading the MX1 base station . . .

While the MX31ZL has contained a RailCom Global Detector for over 2 years (and used for CV reading in "operations" mode and speed indication), based on current development plans, the development of such a device for the MX1 failed due to a lack of personnel resources. Now the work done for the MX1 has been used and developed in a more comprehensive way for implementation in the new MX10.

The "FuRC"-Module, as the name suggests (Radio and RailCom), is more than just a simple RailCom detector.

"FuRC" makes (from an old ZIMO system) almost (not quite, but in many respects) a new ZIMO system by:

- connecting to the **ZigBee radio** (which is used by the MX32FU and the new system) and thus enables the use of new controllers (CABs) on the "old" system,

- using the built-in **Global RailCom Detector to** transmit information on the CAN bus (or transmits via radio), to other CABs and any connected computers, RailCom message for display and evaluation, and

- making available a **USB interface**, for software updates (replacing the CAN Key), and
- allowing **other manufacturers input** (e.g. FREMO-Fred's), to the extent possible as in the MX10.

The core components of the "old " base units (supply of voltage to the rails and the CABS, MX2, MX21, MX31, ABA's etc.) continue to be fully used.

Note: only the base units of the "model 2000" generation (i.e. MX1, MX1HS, MX1EC produced from 2001) can make use of the RailCom signal, but not the older series, "compact line" and "multiprotocol". For these older series, an upgrade with the "FuRC" module is not possible.

*RailCom is a registered trademark of Lenz GmbH.

The new Base Station MX10 – Description:

The MX10 is still under development (hence no photo yet) and will come to market after the MX32 controller, but is described here so that you get a complete overview of the new products. The most important features of the MX10 are:

Operating voltage and current:

The primary source of power comes from an external transformer/rectifier device, so the MX10 can have much higher power in a more compact design, with less power consumption and waste heat, as the transforming and rectification are "out sourced". Therefore a high output (>200W) in a compact form is possible (around 200 x 80 x 30mm, still not final yet).

The operating voltage on the output side is fully stabilized (as in all ZIMO products) and can be delivered in a wide range from 10 to 24 V (fully adjustable) and has overload protection against a short circuit, with a maximum continuous current of 8A, with up to 12A possible for a short time. The current limit and the reaction time for short circuits (for bridging temporary short circuits), are adjustable, and the design of the high-frequency switching regulator ensures that no major peaks occur during short circuits. In additiion, "differential current detection" is activated, which ensures that a sudden increase in current is switched off, and is intended for use in the smaller scales (N, TT, ...) to protect the wheels and rails from damage when short circuits occur.

The MX10 has no separate output for the programming track, although the output for the rails can be switch into this mode. Programming the CVs on the programming track in "Service Mode" has become less important and has been replaced by programming in "Operations Mode" (Programming on the Main, PoM), which is much easier to use and faster, and soon an even more reliable method will be possible with the further development of RailCom (see below).

The MX10 does not have its own display, so the parameters for operating voltage etc. will be shown in a window on the display of the new MX32, and can be modified as needed.

Booster Solutions:

Due to the high current available on the MX10 (up to 12A), only a very large layout will need boosters. In these cases, the preferred method is to use an additional MX10, which is synchronized with the central MX10, and in parallel (on the output side) can handle together an extremely strong load of up to 20 A.

The use of other manufacturers" boosters is possible in theory, but in practice is not recommended as you will lose the data communication (RailCom etc.). The outdated NMRA "Control Bus" (which only provides timing information and short message) is not supported by the MX10.

CAN Bus and other Bus Systems:

The MX10 includes (as is normal for ZIMO base stations) two parallel CAN Bus connections (RJ45, 6 pin) to connect other devices such as controllers (MX32 and its predecessors), accessory and track section modules (MX8, MX9 and successors, plus RailCom Multi-Detectors), as well as external wireless modules. A third socket is intended for the connection of 3rd party systems (e.g. FREMO Freds) and the exact definition of this interface is not yet finalized.

Optional wireless communication:

The MX10 is equipped with a ZigBee radio module. ZigBee is a modern, internationally recognized standard for wireless communication in the 2.4 GHz band. Compared to Bluetooth (also in the 2.4 GHz band), it offers a much better reception over several 100 meters, compared with a built-in Wi-Fi network range, has higher throughput capacity, and can be used worldwide (unlike the 344 MHz radio previously used by ZIMO). Possible disadvantages, compared with the old 344 MHz radio, is the lower penetrating power in buildings, but, so far, no real problems have been experienced during testing and there is always the possibility of adding repeaters to overcome this problem.

The ZigBee technology provides the ideal basis for expansion of the ZIMO system to cover large-scale indoor and garden railways, which is particularly important in the USA, where wireless distribution of the DCC signal is required, even though DCC was specifically designed for rail to wheel transmission.

Interfaces to the Computer:

The USB interface is provided for decoder CV setting (using PfuSch, Train Programmer etc.) or for controlling the layout (using STP, ESTWGJ, Train Controller etc.).

ZIMO offers ZIRC (ZIMO Rail Centre) and ZSP (ZIMO Sound Programmer) with the main tasks of carrying out software updates of all ZIMO products (from base station to decoder), for loading and editing sound projects for the ZIMO sound decoders, and the management and programming of the CVs of ZIMO system devices and decoders.

In preparation for future development, the MX10 is provided with an Ethernet socket.

Track protocols:

DCC and Motorola protocols are supported from the start. The hardware and software are open for expansion to support additional standards, if any are needed, especially for faster transmission of data.

Of course the full capability of the existing protocols are used, so for DCC, you can have 10,239 loco addresses, 2048 accessory addresses (each with 4 sub-addresses), 14/28/128 speed steps, 28 functions etc,

RailCom:

The bidirectional communication known as RailCom is built-in for all relevant ZIMO products, and no add-on boxes or components are needed or any additional RailCom bus. Of course the RailCom messages are displayed on the screens of the controllers, where they belong, and not on any add-on displays.

The MX10 has a built-in RailCom Global Detector, which means it is concerned with any RailCom messages which are independent of location in track sections (Local Detectors, in contrast, .are concerned with the address and location). Precision in this context means that the RailCom signal is analyzed very carefully so that even weak signals below the defined thresholds, can be detected, which is especially relevant in large and complex layouts, where some degradation of the signal can occur.

RailCom messages are dealt with in the base station initially, to improve the efficiency of the data transmission to the decoder (simply: RailCom message which are replies to the decoder messages do not need to be repeated), certain RailCom messages get routed to the controllers or the computer. Simple application include: read and write CVs (in Operations Mode, i.e. with the loco on the track), show the current speed measured in the decoder, power consumption, alert messages, or (for accessory decoders) the position of the point (switch), etc,

Auxiliary Inputs:

The MX10 has (like the MX1) 16 logic level inputs, which can be used to connect a simple interlocking, for connection of emergency Stop buttons, or for triggering stored ABA Events (ABA = automated route setting).

Display and operating devices:

In this respect, the MX10 is rather spartan, choosing to save space for more essential features and save on the final price. A simple but very visible set of LED lights to indicate operation and the rail current are included, as well as two buttons for use as a stand-alone base station and decoder update device. More information is provided to each connected MX32 controller, which have special windows which can be opened to perform tasks on the base station.

Data management for vehicles and accessories:

This is the second main task of the base station, after supplying the layout with the operating current and the DCC (or another protocol) signal. For the mobile and stationary decoders, specific messages from the input devices (controllers or computers) must be communicated in an efficient and reliable way, by rail to the mobile decoders, where they are kept consistent, both with RailCom support and without feedback form the decoders, and always taking into account the possible losses due to interruptions in the signal.

The MX10 is equipped for this with generously dimensioned high-performance micro-controller and memory (RAM and Flash), which can simultaneously control 512 active mobile decoders, plus all addressable accessory decoders, and include stored ABAs (automated route setting) etc.

The MX10 as Decoder Update Device:

The support for loading new software versions and sound projects into the decoder is a logical basic task of the base station. For this purpose, there is no need to buy a separate update device or sound programmer (at least for ZIMO decoders).

The MX10 can be used in 3 different ways as a decoder update device: (1) the decoder is updated using software loaded on a USB stick connected to a computer which is connected to the MX10 (with the loco on the programming track), or (2) Offline, with a USB stick which contains downloaded version of the software or sound projects (previously download by a computer), but the USB stick is connected directly to the MX10 and a number of decoder updates or sound projects loads can be performed, or (3) using the USB connection on the MX32, a USB stick can be connected there and via displays on the MX32 screen, the software or sound projects can be loaded into the decoders, using even a connected keyboard and the MX32 screen

The MX10 as a stand-alone DCC base station:

Users who prefer to avoid using physical controllers can use the MX10 with appropriate 3rd party software (e.g. ESTWGJ, STP, Train Controller etc.) and use the screen display on the computer and any provided software sliders or controls to drive the trains, without any physical controllers (CABs) connected to the MX10. The large current output of the MX10, the intelligent handling of any short-circuits or overloads and the RailCom Global Detector are very useful, plus there is always the option to add walk-around controllers later.

The controller or CAB (Hand-held) MX32:

The new hand-held controller, the MX32, will be delivered before the MX10, so it will be used initially on the older generation base stations (MX1, MX1HS, MX1EC, and also MX31ZL as base station).

The exterior design of the new controllers:

Here we have kept the basic curved wedge shape of the ZIMO designed hand-held controllers, with some modifications to accommodate the larger OLE screen. The basic idea of the shape, so that it can be used fixed down on the layout or as a hand-held controller (walk-about style), is already well-known to ZIMO users. The OLED full colour touch screen with a diagonal size of 2.4 inch and a resolution of 320 x 240 pixels is outwardly the most visible improvement in the MX32 and at the same time supports advanced functionality and a more user-friendly interface on the screen.

Cable Version MX32 and Wireless Version MX32FU:

As already seen with the MX31, the MX32 will come in two versions: (1) as the MX32, always connected with a cable (CAN bus), or (2) as the MX32FU (FU=Funk=Radio), with integrated radio and efficient use of battery, or can be connected with cable to the CAN bus, when it will recharge the batteries. The actual functionality is the same, although some tasks may take longer in the radio version, (e.g. loading large files or photos). As described above for the MX10 base station, the radio version now

uses ZigBee standard for radio communication in the 2.4 GHz wave band. The networking capabilities of ZigBee allow for communication between different MX32 devices (node to node), which can overcome the problem where one of them is in a radio shadow and cannot find the base station.

Software Update via USB Stick:

To make the software update as easy as possible (especially with older base stations like the MX1), the MX32 has a built-in USB host device socket, which can be used with any USB stick, to load new software for the controller (after it has been copied to the USB stick from the ZIMO website). The USB host interface can be used to connect a keyboard, which can make the entering of the loco names into the MX32 loco database much more comfortable, than the phone-style use of the keys on the MX32 keypad.

RailCom*:

In the controllers (CABS) there is no need for special detectors for the RailCom messages. These detectors are either in the base station, or in add-on devices, for the older base stations. RailCom message reach the MX32 via the CAN Bus and play an important role in the operational concept.

As explained above for the MX10, RailCom plays an important role in the ability of decoders to give feedback to the ZIMO system and is an integral part of the system. Of course operation is possible without RailCom enabled decoders, but operation is much improved if RailCom is available. Decoders can report more than just their address and CV values. In practice, this means that decoders which can be updated are preferred, as the software for RailCom enabled decoders is still under development. Even ZIMO decoders only have one extra message (besides address and CV changes confirmation) and that is confirmation of the speed as measured by the decoder, and is dependent on future software updates for more (other manufacturers products do not have even that).

RailCom is a pre-requisite for the automatic registration of locomotives in the DCC system, and will, in future, remove the annoying problem that the locomotive cannot be controlled because it has forgotten its address and no programming track is available, Even the basic RailCom makes finding address on the main possible (although quite slow), provide each decoder has a unique id allocated during manufacture. Most decoders do not have this unique id and ZIMO have only just start producing sound decoders (as of the beginning of 2009), which again emphasizes the need to able to update the decoders.

The operating concept:

The keypad layout and the basic operating strategy come from the proven MX31. But the operating and programming functions provide much better information and more usability, and in the future this will be expanded via software updates. This is made possible by the high-resolution OLED touch-screen display with powerful 32 bit microcontroller, together with large memory (several GB of RAM and Flash memory)..

As always, with modern devices, the aim is to make the use of the MX32 possible without a detailed study of the manual (intuitive). Of course the user must have a basic understanding of the principles of operating with DCC and understand that this device offers more than the well-known tasks of simple hand controller, such as Set Address, Driving, and Switch Points. In the current usage, the user finds on the screen advice about current options e.g. the current meaning of the soft-keys, and other functions assigned flexibly to function keys, and can, if necessary, also show context-sensitive help files.

The touch-screen function is used primarily to change the display (change between small and large photos of locos, switching the scale of the speedometer, pages in re-call memory, etc.). For the actual operation (driving) of locos, you can use the keyboard with LED indicators for speed, the sliding control, the thumb (scroll) wheel and the side rocker switches, which together provide an extended joy-stick function.

In the operating mode DRIVE,, if the decoders and base station support RailCom, then RailCom can provide the following information: show actual speed on the speedometer, the engine load, the current being used, the pre-calculated stopping distance, and other things (independent of RailCom) such as a photo of the loco on the screen, or symbols, and the current assignment of the function keys through the use of icons (with 50 x 40 pixels, quite descriptively).

Another emphasis is in the usage of DRIVE PROG, or programming on the main (PoM). Even decoders from other manufacturers (besides ZIMO) can be supported by CV handling with command line storage and CV-Set management, ZIMO decoders go beyond that with CV values grouped by category. RailCom with its function of CV readout is also very helpful, and is really essential for the full benefit of the user interface.

The operating mode SWI (=SWITCH, or Points and Signals), for traditional reasons, still requires the typing of an address and the switching of the point (or signal) via a function key, but this will be improved by future software versions. Points (switches) and signals can be grouped together, regardless of their actual connection to decoders or modules, summarized into "Switch Panels" which can be operated by a single function key or touch screen. Planned in the future, in addition to the point ladders and ABAs (automated routes), which existed in the MX31, are miniature layout diagrams on the controller screen, probably in cooperation with signal box software at the computer, like STP or ESTWGJ.

*) RailCom is a Trade Mark of Lenz GmbH

Images of the new MX32 controller will appear soon in the Newsletter or on www.zimo.at!