

AUSGABEN:

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# Operating instructions

## ***CAB (HANDHELD) MX2***

including:                    Wireless (infrared) cab MX2/IF   and   infrared base module MXIF

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# 1. Introduction

**MX2** is used for desktop or walk-around operation on the CAN bus cable; **MX2IF** is operated either by cable or by bidirectional infrared communication.

NOTE: This manual deals with all aspects of MX2 operation in layouts using NMRA-DCC protocol and/or MOTOROLA format. In contrast to the German manual it does not describe matters relating to the "old" ZIMO data format. This means, that you can only rely on this manual, when used together with a command station MX1/N (not MX1/Z or MX1/MULT).

## Addresses and numbers:

The various objects (decoders, routes, ..) to be controlled by MX2 require a clear assignment of address resp. number ranges to different functions.

digits in display	key for activation	protocol	function
addresses 1 - 127	F	DCC	loco decoders standard range
addresses 128 - 10239	F	DCC	loco decoders extended range
addresses 1 - 255	W	DCC	accessory decoders standard range
addresses 256 - 511	W	DCC	accessory decoders extended range
addresses T0 - T80	F	MOT	loco decoders
addresses T0 - T63	W	MOT	accessory decoders
numbers 700 - 799	-	-	routes (each number = 8 routes)
numbers 800 - 899	A	CAN	accessory modules MX8
numbers 900 - 963	A	CAN	track section modules
numbers 980 - 999	A	CAN	turntable modules

Addresses for the MOTOROLA format must be typed in with Prefix "T", if the command station MX1 is in "multiprotocol" mode (i.e. if both DCC-jumper and MOT-jumper are inserted). If DCC-jumper is removed (so only MOTOROLA is in use), no prefix is necessary.

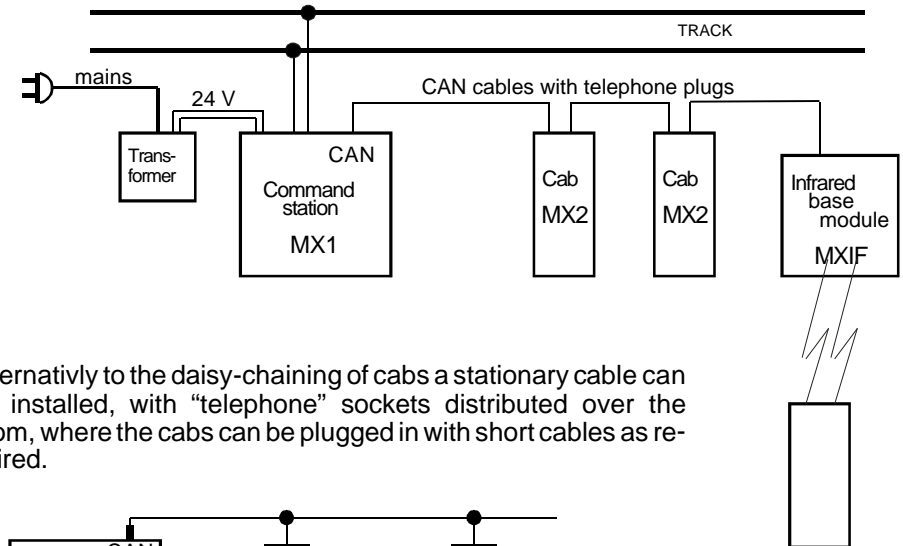
# 2. Specifications

Power consumption (if command station is supplied with 24 V)	100 mA
Dimensions	166 x 74 x 38 mm
Weight MX2 / MX2IF	220 g / 300 g

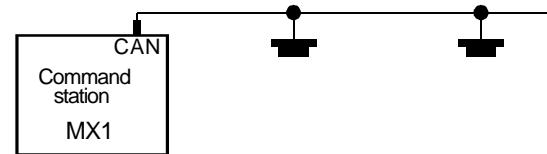
# 3. Connecting the cabs to the command station MX1

Each cab MX2 contains two identical (internally parallel) sockets for the CAN Bus cables in order to be connected to the command station and to daisy-chain further cabs and other ZIMO products.

Cables in standard lengths are available from ZIMO. Alternatively you can obtain the "telephone" plugs, cable and mounting tool from ZIMO to make your own CAN Bus cables as required.



Alternatively to the daisy-chaining of cabs a stationary cable can be installed, with "telephone" sockets distributed over the room, where the cabs can be plugged in with short cables as required.



Cabling distances can be as long as several hundred meters; in usual applications (up to about 50 m total length of all CAN cables) the cabling is fully unrestricted (no compensating resistors necessary). For larger distances a linear configuration of devices and the use of resistors (typ. 330 E) at both ends is to be preferred.



The CAN cables contain 6 wires (including power supply for cabs) and are ended with "telephone" plugs fitting to the sockets in ZIMO devices.

**LCD display:**

3-digit display for loco address, accessory decoder address, accessory module address, track section module address, route number, turntable address.

Display of system states, (short-circuits, etc.)

The colour of background illumination shows the cab state:  
 green - Active loco state  
 red - Active accessory state  
 yellow - deactivated

The "communication point" (right corner) shows if communication via CAN Bus resp. via infrared link is working properly (flashing after operation is good, remaining on or off is bad).

**The "little" keys:**

"F" - Activation of loco address or rotation of loco background.

"W" - Activation of accessory decoder or accessory module address or rotation of background memory.

"Ü" - Handing over an address from another cab.

"C" - Clearing the active address from the foreground and background.

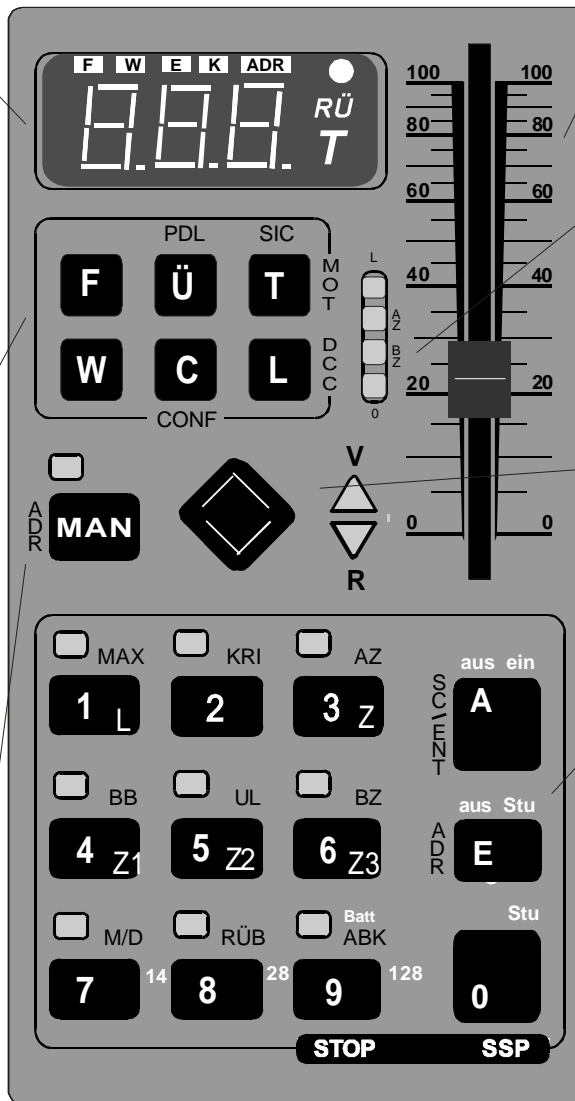
"T" - Assignment and de-assignment of a loco address to a consist.

"L" - Together with "E" slide control set to half range (slow motion) or shift key in the 12 - function mode; also used in the "E - procedure" for changing into the 12 - function mode.

The "T" key is also used als prefix for MOTOROLA addresses, the "C" key also is used within the addressing and programming procedures in order to change into programming mode.

**The "MAN" key:**

Only for ZIMO DCC decoders; for overriding the "signal controlled speed influence"



**The slide control:**

Speed control for the loco address in the foreground or - if the cab is in accessory state - for the loco, which was active before.

**The "light bar":**

A running light after activating a loco address means, that the "old" speed of the loco must be captured by the slide control; only after this speed control is possible.

The two middle LEDs show, if "AZ" resp. "BZ" is on (acceleration resp. deceleration time).

The lowest LED (red if train stoped, green if running) shows by short flashes the changes from one speed step to the next, if slide control is moved.

**Direction key and direction LEDs:**

Changing the direction for the address in the foreground or for the whole consist.. Also - if the cab is in accessory state - for the loco, which was active before.

**Digit keys, "A" and "E" keys:**

The digit keys are used for typing in addresses and numbers; in active loco or accessory states they are used for controlling the decoder function outputs resp. the turnouts or signal lights.

The "A" key is used for activating or for deactivating addresses (if the mode - loco or accessory - should not changed from the last time activated - otherwise "F" or "W" keys must be used).

With the "E" key all "E-procedures" are started.

Further important operations are:

- starting addressing and programming procedure by "A" and "E" simultaneously.
- definition of speed step system by "A" and "0" simultaneously and then pushing one of the keys "7" to "9"
- switching on and off power of infrared cab MX2IF by "A" resp. "A" and "E" simultaneously.
- Broadcast Stop by "0" (= "SSP") in active states.

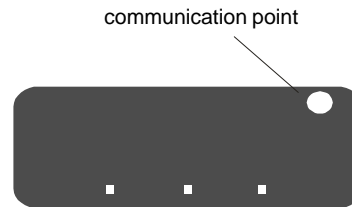
## 4. Activating loco address, operating the loco

These are the basic procedures which are necessary to run a train. It requires a loco which known address (the default address for new ZIMO loco decoders is "3", sometimes "5"); the procedure for addressing is described in chapter 12.

### THE CAB IN "EMPTY STATE":

A new cab or a cab after deleting its memory (by pushing "C" until all addresses have disappeared) is in the "empty state".

- ✍ LCD display yellow, only the **decimal points** are on; the "communication point" is flashing every 2 secs (this shows the communication with the command station is working).



### TYPING IN A LOCO ADDRESS AND ACTIVATING THE CAB:

The decimal points - in "empty state" or after deactivating the previously active address - prompt for input.

- ✍ The loco address is typed by the digit keys "1" to "0"; the display shows the input. Addresses higher than 999 are displayed by alternating showing upper and lower digits. Wrong numbers can be corrected by overwriting them. While typing in the display remains yellow, and the decimal points remain on.



An address like the example shown is a DCC-address. MOTOROLA addresses are prefixed by "T", shown in the display as "o".

- ✍ The address is activated by "**F**" key or "**A**" key.

If "A" key results in "active accessory state" (red display), then deactivating (again by "A" key), new typing of the digits and again activating - now with "F" key must be done.



- ✍ The cab comes into the "ACTIVE LOCO STATE"; the display is now green, the symbol "F" appears, and the decimal points disappear.

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#### If address in the LCD display is flashing ...

this means, that activating this address is not allowed, because this address is not valid or because it is already active on another cab.

In the latter case overtaking this address is possible by "Ü" key; then the flashing is stopped on the own cab, and the other cab starts flashing. Details in chapter 7!

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#### If the "light bar" shows a running red or green light ...

this means, that the slide control is in a position differing from the speed stored in the command station (i.e. differing from the position of the slide control at the last time this address was active). The running light shows the direction, where the slide control should be moved to capture the old speed setting and get into active speed control.

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In the ACTIVE LOCO STATE the loco can be controlled by:

- ✍ the **slide control** (speed),
- ✍ by the **direction key**,
- ✍ the "**MAN**" key, which allows to override the "signal controlled speed influence" for ZIMO decoders. The "MAN" key switches on and off the "MAN" state, which is displayed on the red LED above the key (flashing if "on").
- ✍ the **keys "1", "2", ..., "8"** (also marked with the ZIMO traditional letters "L", "Z", etc.), which controls the functions F0 - F7 of the decoder. The actual state is shown by LEDs above the keys (yellow is "on").

If the loco address is in the 12 - function mode (change into this mode by "E - procedure" with "little L key" - see page 6 -, also functions F8 and F9 - F12 can be controlled: holding the the "little L" key like a Shift key assigns key "9" to F8 and keys "1" - "4" to F9 - F12.

By means of the "E-procedure M/D" (see chapter 8) you can choose between permanent operation (default; function output switched on and off by the key) and momentary operation (function is "on" while key is pressed).

Further operation possibilities in the ACTIVE LOCO STATE:

- ? "**E-procedures**" (see chapter 8),
- ? **Broadcast stop "SSP"** (stopping all trains on the layout) by "**0**" key ("**SSP displayed** alternating with the address on all cabs).
- ? While in "broadcast stop" state **track-voltage switch-off** can be done by "A" key (display "AUS" alternating with the address).
- ? "**STOP**" the train actually addressed by key "9"

## DEACTIVATING THE ACTUAL LOCO ADDRESS:

- Deactivating is done by “A” key (marked with a little “D” therefore). The decimal points appear, the display becomes yellow - prompting for a new input.

## 5. The background memory

After deactivation the loco address does not disappear completely, but it remains in the background memory of the cab, which is able to hold up to 10 loco addresses (and in a separate section 10 accessory addresses). A little “RÜ” in the LCD display shows, that at least one loco address is contained in the background.



The addresses stored in the loco background can be retrieved by by the “F” key. By repeated pushing the “E” key the whole loco background memory can be run through cyclically (“W” key makes a run through the accessory background memory).

NOTE: By “E-procedure RÜB” the depth of the background memory (default = 10) can be reduced; any number between 1 and 10 can be defined (see chapter 8).

All current loco data (speed, direction, functions, etc.) is stored permanently in the command station. If a loco address is activated (after typing in and activation or by retrieving from the background) this data comes again in the foreground.

**Clearing** a loco address from the **background memory** is done by “C” key while this address is active. Repeated pushing the “C” key” clears the whole loco background memory. The same is true for the accessory background memory, if “C” key is pushed while an accessory address is active.

## 6. Multiple consist control

The “T” key is used to combine up to 10 locos to form a multiple consist on the MX2. Using this method there is no need for the configuration variable “consist control” in the decoders (although the new ZIMO decoders have this feature, too).

- In order to include a loco address in a consist control the address has to be active and the loco has to be stopped (speed = 0). Pushing the “T” key makes a “T” appearing in the display,



- This can be done for up to 10 loco addresses; each address marked with “T” will be part of the consist controlled by this cab.



- Pushing the “T” key a second time the consist assignment is cleared for this address (“T” disappears).

## NOTES:

All loco addresses marked with “T” in the display belong to a consist. Only one consist can exist in each cab MX2.

Locos of the consist have the **same speed, direction and “MAN” state** (all locos are affected by slide control, direction and “MAN” keys), but the function outputs are controlled independantly for each address (only the functions of the loco actually in the foreground are affected). Running through the addresses of the consist is done by “F” key (this includes also the addresses in the background, which are not part of the consist).

With “C” key not only the address in the foreground is cleared, but all addresses of the consist are removed from the background memory of the cab. But the consist is stored in the command station, and all addresses come back to the cab (or to an other cab), when one of the addresses is activated. So the number of consists stored in the system is virtually unlimited.

A **flashing “T”** in the LCD display means, that it is not possible to get the addresses of a consist stored in the command station into the cab, because there is already another consist in the cab. You can insist on taking the new consist in the cab by pushing the “Ü” key; then all addresses of the “old” consist are automatically removed from background of the cab (but are stored in the command station).

## 7. Handing over trains between the cabs

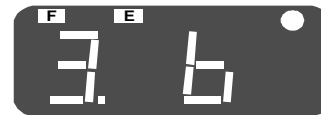
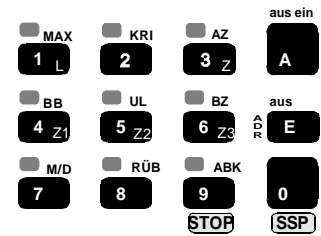
As already mentioned, activation of an address is refused, when the address is already active (i.e. in the foreground) on another cab. This is shown by flashing of the LCD display.

- The “Ü” key makes the address is handed over to the “new” cab; the flashing is stopped; the address on the “old” cab starts to flash.

## 8. The "E - procedures"

The "E-procedures" (they all start with "E" key) allow the definition of various parameters for loco and cab characteristics for a particular loco address. They can be carried out in the active loco state or in the active accessory state.

- ✍ After pushing the "E" key the LCD display shows "E".
- ✍ Pushing one of the digit keys defines, which of the parameters should be modified (every digit key has an additional label above it: 1: MAX, 2: KRI, 3: AZ, ...).
- ✍ This digit appears in the display in place of the "E"; the actually valid value for the parameter also appears in the display; e.g. "3. 0" means AZ has the actual value "0"). The little symbol "E" flashes during the procedure.
- ✍ The new value is typed in.
- ✍ Finishing of the "E - procedure" by the "E" key.



**NOTES:**  
The "E - procedure" can be interrupted any time by the "E" key; so it can be used alternatively for inspection of a parameter, too.

The following parameters can be defined by "E - procedures":

"AZ" ("3"), "BZ" ("6"), "ABK" ("9"):  
ACCELERATION TIME, DECELERATION TIME,  
ACCELERATION-DECELERATION-SEQUENCE

These parameters have nothing to do with the configuration variables # 3 und # 4 in DCC decoders, although the meaning is similar. But "AZ" and "BZ" are handled by the cab resp. by the command station MX1, so they work also for decoders, which do not have CVs and they also work for MOTOROLA decoders.

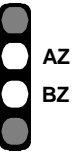
For each of these parameters values between 0 and 15 can be defined. For "AZ" (acceleration) and "BZ" (deceleration) this means times between 0 and 15 sec; for "ABK" various sequences are prepared.

Procedure:

Key "E", key "3" resp. "4"(AZ resp. BZ), new value (e.g. "6"), key "E".

Besides the normal "E - procedure" for defining values for "AZ" and "BZ" there is a special **quick procedure** for switching on and off "AZ" resp. "BZ".

- ✍ Pushing the "E" key together with "AZ" resp. "BZ" sets "AZ" resp. "BZ" to "0" "zero" or to the predefined value (by "E - procedure"). The two middle lights in the light bar show, whether "AZ" and "BZ" are on or off.



### L - KEY (the little L Key): SWITCH ON/OFF 12 - FUNCTION MODE and PULSE CHAINS

In the "normal" state of MX2 (and MX1) the keys "1 to "8" control the function outputs of the decoder. If more functions should be controlled (the NMRA standards allow 13 functions, F0 - F12), the cab and the command station must be informed, to build for this loco address the DCC commands for 12 functions.

In order to change into the 12 - function mode a special "E - procedure" is used:

Key "E", key "L" (one of the small keys, not the key "1"); then the LEDs above the keys "1" and "2" are working as follows (other LEDs off):

Key and LED "1": red - 8 functions ("normal" state)  
green - 12 functions  
switching between 8 and 12 functions by key "1"

Note: If a decoder MX66 should be controlled, also the decoder is to be configured for 12 functions by CV # 29, Bit 3 = 0! This is related to the place of the MAN bit (old or NMRA compatible).

Key and LED "2": red - normal functions  
green - pulse chains for controlling LGB digital locos \*)  
switching on and off pulse chains by key "2"

\*) the function of these locos (usually sound functions) are not controlled by F1, F2, F3, etc. but by pulses on F1 (e.g. 3 pulses on F1 mean function 3).

“RÜB” (“8”): REDUCTION OF BACKGROUND MEMORY PLACES

As mentioned in chapter 5 the depth (number of loco addresses) of the background memory can be defined by the “E - procedure RÜB”. The default value is “10”; this is also the highest possible value.

Procedure:

Key “E”, key “8” (= RÜB), new value (e.g. ”3”), key “E”.

“M/D” (“7”): PERMANENT/MOMENTARY FUNCTION OPERATION

Each of the function outputs (“L”, “Z”, “Z1”, “Z2”, “Z3” resp. “1” to “8”) can be controlled alternatively by permanent operation (this is the default; the function output is switched on and off by the function key) and momentary operation (function is “on” while function key is hold down).

Procedure:

Key “E”, Key “7” (= M/D), LEDs above function keys are red (means “permanent”) or green (means “momentary”) (they can be changed by the function key), key “E”.

“PDL” (“Ü”): SHUTTLE TRAIN - ASSIGNMENT

The command station MX1 has 4 inputs for contact rails. Each of these can be assigned to a certain loco address, where the activation of the contact (i.e. if track voltage comes to the input pin) makes the loco run in a certain direction.

Procedure for assignement of loco direction to contact input:

Key “E”, Key “Ü” (= PDL), LEDs above keys 1 to 4 are dark (means: no effect), green (means: loco direction should become forward) or red (means: loco direction should become backwards); they can be changed by function key, key “E”.

Very important, if using DCC decoders from other manufacturers !

**DEFINITION AND CHANGE THE SPEED STEP MODE:**

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**There are three systems for speed control of decoders following the NMRA-DCC recommended practices: 14, 28 or 128 speed steps**

ZIMO DCC decoders can be operated in all 3 ways (14, 28 or 128 speed steps, by default they are configured to 28 and 128 speed steps), but some decoders from other manufacturers are restricted to 14 speed steps (or they are configured by default to 14 steps, although they are able to work on 28 and/or 128 speed steps).

It is essential, that the speed step mode of the system (cab) corresponds with the speed step mode of the decoder (defined by Bit 1 in Configuration variabel#29)!

NOTE: If a decoder is configurable, then Bit 1 in configuration variable#29 decides on the actual working speed step mode; Bit 1 = 0 means 14 speed steps, Bit 1 = 1 means 28 speed steps. If the decoder is able to decode 128 speed steps, then Bit 1 = 1 means both 28 and 128 speed steps, too (this is a little bit confusing ...).

**If a decoder is configured to 14 speed steps, also the system must be configured to 14 speed steps for the address of this decoder.**

**If a decoder is configured to 28 speed steps (which also can mean 128 speed steps), the system must be configured to 28 or 128 speed steps for the address of this decoder.**

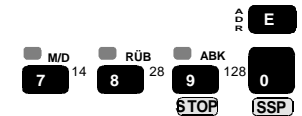
If speed step modes between system and decoder are **not corresponding**, the loco still runs (this is again confusing ...), but the headlights will not work properly (they are flashing with speed changes or they are always dark).

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By default the ZIMO system (cabs MX2 resp. command station MX1) works with 28 speed steps for all loco addresses. Changing this for a certain address and checking the actual status is done by the following procedure:

✂ ✂ Keys “E” and “0” must be pushed simultaneously and held.

While both keys are held down, one of the LEDs above the keys “7”, “8”, “9” is illuminated; this means 14, 28 resp. 128 speed steps.



Changing the speed step mode is done by pushing the corresponding key (“7” for 14, “8” for 28, “9” for 128) while keys “E” and “0” are hold down.

The current mode is stored in the command station and it is applied regardless of the cab used. The definition must be done for each loco address separately !

## 9. Controlling accessory decoders

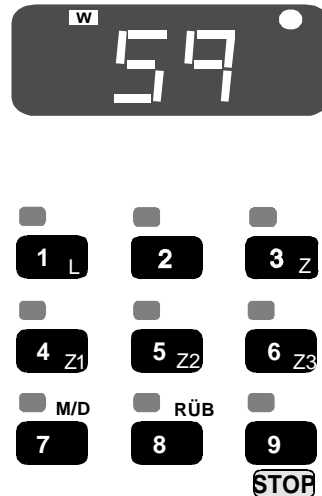
### TYPING IN ACCESSORY DECODER ADDRESS AND ACTIVATING:

- After deactivating the previously active (loco or accessory) address, the new address is typed by the digit keys "1" to "0"; the display shows the input. While typing in the display remains yellow, and the decimal points remain on.
- The active address is activated by "W" key.

If this address was active some time before as accessory address, then activating by "A" key is possible, too ! By "A" key always the state comes again, which the address had the last time.

#### In the ACTIVE ACCESSORY STATE

- LCD display is red, decimal points disappear, the symbol "W" is displayed, the "communication point" shows communication with command station like in active loco state.
- By each of the digit keys "1" to "4" one turnout can be switched to right and left position. The actual position is displayed by the LED above the key. If decoders with feedback are used, the LED display shows the real position.
- Alternatively 8 sperarate functions can be controlled by digit keys "1" to "8" e.g. decouplers, signal lights. An "E-procedure" with key "9" (values "0", "1") is used to switch between the modes for 4 paired functions and 8 separate functions.
- By slide control, direction key and "MAN" key the loco, which was active before changing in accessory state, can be controlled also while the cab is in accessory state !**



### BACKGROUND MEOMRY FOR ACCESSORY ADDRESSES:

Similar to the background memory for loco addresses there is place for 10 accessory decoder addresses. Every time a accessory address is deactivated, the address comes into the background memory. By "W" key the addresses can be retrieved cyclically from the background memory and brought into foreground again.

## 10. Controlling accessory modules

Accessory modules are special ZIMO devices, which have similar functions as accessory decoders, but they are not connected to the track. They are not controlled by the DCC signal, but directly by the CAN bus of the ZIMO system. They do not need the power from the system central unit (command or power station), but they can be supplied (alternativly) by a separate transformer.

More about this you find in the operation instructions for MX8 !

### TYPING IN ACCESSORY MODULE ADDRESS AND ACTIVATING:

- An accessory module MX8 is controlled by an address between 800 and 863. Because there are 16 turnout outputs or 32 separate function outputs per MX8, but only 8 function keys on the cab, a group number must be added to the address.



So the "extended address" (address + group number) consists of 4 digits. e.g. "802.2" or "825.3". Because the display of MX2 allows only 3 digits to be shown, the first digit (the "8") disappears from the display after typing in the fourth digit (which is the group number).



- The acesyory module address (including the group number) is activated by "W" key, the display becomes red, "W" is flashing (this is to distinguish from an accessory decoder address).

#### In the ACTIVE ACCESSORY STATE:

- By digit keys "1" to "8" turnouts can be switched or single functions can be controlled. The LED above the key shows the actual position. MX 8 modules are equipped with feedback, so the display shows the real position, if proper turnouts are used.
- By "E - pcedure M/D" you can select - in case of single functions - whether permanent or momentary operation should be done; in case of paired functions (turnouts) you can select whether the LED should flash while waiting for feedback or not.
- By slide control, direction key and "MAN" key the loco, which was active before changing in accessory state, can be controlled also while the cab is in accessory state !**



## 11. Control and display of system status

**In active loco or accessory state** following system functions can be called:

- ? BROADCAST STOP by "0" (= **SSP**) key, "SSP" (German: "SammelSTop) displayed on all cabs alternating with actual address. By pushing the "0" key again broadcast stop is canceled.
- ? SWITCH-OFF TRACK VOLTAGE by "A" (= **aus**) key - only in Broadcast stop state -, "AUS" displayed on all cabs alternating with actual address. By pushing the "A" key again voltage is switched on again.



### System overload conditions:

- ? TRACK OVERCURRENT (SHORT-CIRCUIT) is displayed by "UES" (german "UEberStrom) on all cabs. In some cases this is not due to high current but due to low transformer voltage (transformer is not strong enough). Switching on the track voltage is done by "A" key.
- ? PROGRAMMING TRACK OVERCURRENT is displayed by "UEP". Switching on the voltage on programming track is done by "A" key.
- ? If an addressing and programming procedure was started on any cab, all other cabs show "Adr"; this means the system is busy with programming and does not accept inputs from other cabs (but the trains go on moving).
- ? "AAF" means a communication problem between the cab and the command station MX1. Reasons could be a faulty cable or lacking of infrared connection.



## 12. "Service mode" addressing and programming of decoders and modules

All "service mode" addressing and programming procedures are started by **simultaneous pushing the "E" and "MAN" keys.**



"A" appears in the yellow LCD display.

The further procedure depends on the next input (they are all similar, but not identical):



Address (0 to 10239), then "F" key or "W" key -  
Addressing and programming a DCC loco ("F") or accessory ("W") decoder.



"A" key (without preceding digits) -  
DCC address scanning (read out the loco address)

"T" key, address (<80), "F" key -  
Addressing a MOTOROLA decoder from UHLENBROCK (not Märklin, because Märklin decoders are addressed by hardware switches).

"100", "A" key  
Programming the CVs of the command station MX1 "model 2000"

Address (800 - 863), then "A" key -  
Addressing an accessory module MX8.

"8" (without succeeding digits), "A" key -  
MX8 address scanning (read out the address).

Address (900 - 963), then "A" key -  
Addressing a track section module MX9.

"9" (without succeeding digits), "A" key -  
MX9 address scanning (read out the address).

By **"C" key** you can change from addressing in programming procedure, i.e. writing and reading the configuration variables of DCC decoders or MX8 or MX9 modules.

while addressing and programming decoders all other cabs are not usable (showing "Adr"); while programming modules, this is not the case.

The addressing and programming procedure can be left any time by pushing the **"E" key.**

## 12.1 Details for programming and addressing DCC decoders

This procedure is valid for ZIMO DCC decoders (loco and accessories) and decoders from other manufacturers (Lenz, Roco, Digitrax, etc.). The decoder (or the loco with the inbuilt decoder) must be on the programming track resp connected to the programming track output of the command station MX1.

NOTE: The meaning of the configuration variables can be taken from the operating instructions of the decoders.

- \* The procedure is started by simultaneously pushing the “E” and “MAN” keys, “A” appears in the display.
- \* By pushing the “A” key (without digits before) you can start reading out the actual address of the decoder. If the address is found, then it will be displayed; if not, “Er1 ... 9” is displayed.

NOTE: The address scanning is only possible, if motor and/or headlights (better: both) are connected to the decoder, because the acknowledgement is done by current pulses on these decoder outputs.

For decoder programming the address must be typed in and terminated by “F” key (for loco decoder) or “W” key (for accessory decoder).

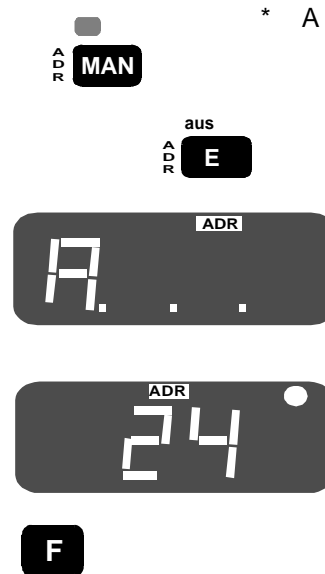
Most decoders are able to acknowledge the successful addressing by current pulses (if motor and headlights are connected to the decoder outputs). When the acknowledgement is arrived, the symbol “ADR” stops flashing, and, if the address consists only of 2 digits, a “0” appears in front of the number.

special case is the **addressing to address “0” (zero)**: this makes a **hard reset** to the decoder (if the decoder is able to perform a hard reset), which sets all configuration variables to their default value.

The address “0” must be terminated with “A” (not “F” or “W”); this is a protection against wrong input.

Hard reset is not acknowledged by the decoder. The success can only be proven afterwards by testing.

- \* By “C” key the procedure for programming configuration variables can be started. There comes automatically a proposal for the first variable number to the display (the number “2”). This proposal can be accepted by “A” key or overwritten; the input again has to be terminated by “A” key.



Now the cab prompts for further input (the value of the configuration variable) by showing “\_\_\_\_\_”. It is now possible to input a value and terminate it by “A” key or to make a readout by pushing “A” without digits before.

- \* By each further pushing of “C” key the procedure goes to the next configuration variable; again this proposal can be overwritten. Etc.
- \* The addressing and programming procedure can be left any time by pushing the “E” key.

### Error codes in the addressing and programming procedure:

Er0: Voltage too small (< 12 V) at begin of programming.  
 Er1: Timeout in voltage measurement  
 Er2: Overload at begin of programming (> 250 mA)  
 Er3: Voltage too small for recognition of ack pulse (more than 60 mA current difference necessary)  
 Er4: No acknowledgment (programming failed or motor / headlights are not connected to decoder)  
 Er5: Overcurrent in negative driver bridge  
 Er9: Configuration variable does not exist

## 12.2 Programming of UHLENBROCK MOTOROLA decoders

The procedure is similar to that for DCC decoders, but there is no scanning (read out) possible.

In contrast to the procedure for DCC decoders every time the actual address of the decoder must be typed in (also for changing the address itself in register 1 or for changing other registers). A decoder with unknown address is therefore not programmable; the only way is to find out the address by trial and error (80 possibilities) !

## 12.3 Addressing and programming of MX8 modules

The **accessory modules MX8** are not controlled by the data on the track, but by CAN bus. They can be programmed to addresses 800 to 863 by a cab procedure similar to DCC addressing.

In the addressing procedure a additional digit (so all together 4 digits) must be typed in, which defines the number of groups for the MX8 outputs:

- number of groups = 2: MX8 should control 16 turnouts
- number of groups = 3: MX 8 should control 8 turnouts and 16 single functions
- number of groups = 4: MX8 should control 32 single functions.

The configuration variables of the MX8 module are described in the operating instructions of MX8.

### 13. “On-the-main” programming of DCC decoders

- \* The programming procedure is started by simultaneously pushing the “E” and “F” keys (for loco decoders) or “E” and “W” (for accessory decoders).
- \* “C..2” appears in the display; this means, that the configuration variable # 2 is suggested for programming. This can be confirmed by “A” key or overwritten by another number (also to be terminated by “A key). Then the value for the configuration variable can be typed in (also terminated by “A”).
- \* Input of further configuration variables is started by “C” key.
- \* Actually it is not possible to read out configuration variables “on-the-main” ! This will be possible with the MX1ARI board for the command station MX1, which will receive the acknowledgement pulses of the ZIMO decoders.

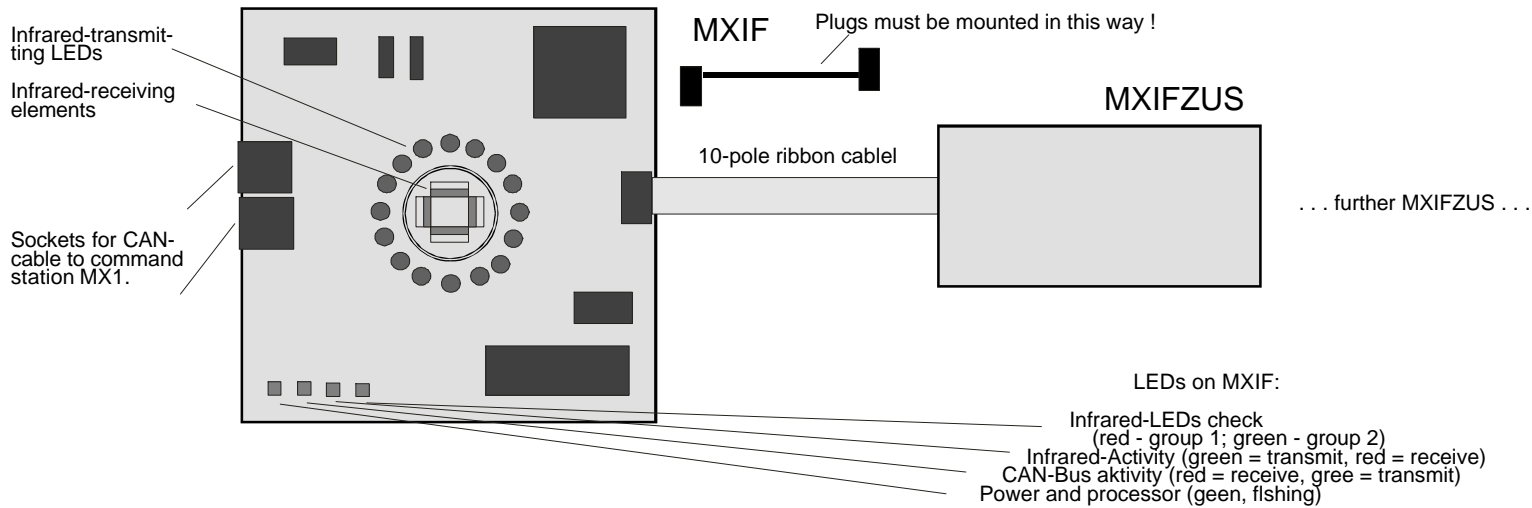
## Infrared cab MX2IF and infrared base module MXIF

The infrared base module MXIF is able to communicate with up to 4 infrared cabs.

The infrared cab MX2IF is powered by a rechargeable battery. In cable operation the battery is loaded automatically within about 2 hours; a red LED above key "9" shows loading state; when the LED becomes green, loading is complete.

In infrared operation the cab can be switched on by "A" key and switched off by simultaneous pushing of "A" and "E" keys. After 10 min of not using the cab it is switched off automatically.

The "communication point" in the LCD display shows, if the bidirectional communication between infrared cab and infrared base module is working (it should not remain permanent after pushing a key or after using the slide control).



Currently only in German language available :

## 15. Definieren und Anwenden von Weichenstraßen

Unter "**Weichenstraße**" ist eine Kombination von Weichen und ihren Stellungen zu verstehen, die vorerst durch einen Definitionsvorgang festgelegt wird, und danach bei Bedarf aufgerufen werden kann.

Eine "**Fahrstraße**" ist in der hier verwendeten Bezeichnungsweise eine erweiterte Weichenstraße, d.h. eine Kombination von Weichen und ihren Stellungen, gegebenenfalls auch von Tasten (anzuschließen über Tastenanschlusseinheiten) und von Gleisabschnitten (über Gleisabschnitts-Module MX9). Siehe Kapitel 15!

Um eine **Weichen- oder Fahrstraße definieren** zu können, wird ein Basisgerät MX1 und mindestens ein Fahrpult MX2 oder MX2/IF benötigt (MX2/IF muß allerdings in der Definitionsphase am Kabel betrieben werden).

### Das Definieren einer Weichenstraße:

**Grundsätzliche Hinweise:** Alle Informationen zu Weichen- und Fahrstraßen werden im Basisgerät MX1 abgespeichert; die Fahrpulte dienen "nur" als Eingabe- und Anzeigeräte. Daher sind definierte Fahrstraßen von jedem Fahrpult aus aufrufbar; es bedeutet natürlich auch, daß jede Fahrstraßen-Kennung nur einmal im System vergeben werden kann. Es gibt insgesamt 890 Fahrstraßen-Kennungen (701.1, 701.2, 701.3 . . . 799.8, 799.9). Wieviel davon tatsächlich verwendet werden können, hängt vom verfügbaren Speicherplatzes im Basisgerät und auch von der Komplexität der einzelnen eingespeicherten Fahrstraßen ab.

#### Das Einstellen der gewünschten Weichenstraßen-Kennung:

Die Weichen-Kennung ist eine **Gruppenadresse zwischen 701 und 799**, die am Fahrpult wie eine Fahrzeugadresse eingegeben und aktiviert wird (mit der Taste "A"), und welche für eine Fahrstraßengruppe steht, in Verbindung mit **einer weiteren Ziffer (1 bis 9)**, welche aus der Gruppe die einzelne Fahrstraße bestimmt.

Nach der Aktivierung der Gruppenadresse (**rote Hintergrundausschleuchtung der LCD-Anzeige**) zeigen die LEDs oberhalb der Tasten "1" bis "9" an, ob die betreffenden Fahrstraßen-Kennungen noch frei oder bereits belegt sind:

Tasten-LED grün: Weichenstraßen-Kennung frei (also neue Definition möglich)

Tasten-LED gelb: Kennung belegt (neue Def. erst nach Löschen der alten)

(alle) LEDs rot flackernd: Speicherplatz für Weichenstraßen verbraucht  
(keine neue Definition mehr möglich)

Um nun die gewünschten Fahrstraße tatsächlich definieren zu können, wird die betreffende Taste ("1" bis "9") **lange (1 sec) gedrückt**, daraufhin wird die

Tasten-LED rot/grün-wechselnd: Weichenstraße im Definitionszustand

Um eine bereits **gespeicherte Weichenstraße zu löschen** (wenn also die zugeordnete LED gelb leuchtet), wird die zugehörige Taste **zusammen mit der Taste "C"** gedrückt; die LED wird in diesem Fall vorerst grün (= frei); erst bei einem weiteren Tastendruck gelangt man in den Definitionszustand.

#### Das Abspeichern von Weichen- und Signalstellungen:

Nachdem der Definitionszustand (wie oben beschrieben) eingeleitet ist, müssen die abzuspeichernden Weichen und Signale geschaltet werden.

Dieses kann **vom selben Fahrpult aus** geschehen (Gruppenadresse mit Taste "A" verlassen, gewünschte Magnetartikeladresse einstellen und mit Taste "W" aktivieren) **oder von jedem beliebigen anderen Fahrpult aus**.

Das **Betätigen der Magnetartikel** erfolgt ganz wie im normalen Schaltbetrieb, einschließlich des Wechsels zwischen verschiedenen Magnetartikeladressen; von der im System stattfindenden Abspeicherung merkt man dabei nichts.

Jede Weiche (ebenso jedes Signal), welche in der zu definierenden Fahrstraße enthalten sein soll, muß zumindest einmal (aber beliebig oft hin- und her) geschaltet werden, wobei es zuletzt in der gewünschten Stellung zu belassen ist. Die Abspeicherung in der Fahrstraße erfolgt in der Reihenfolge der Betätigung.

#### Verlassen des Definitionszustandes (= Fixierung der Abspeicherung):

Die **betreffende Gruppenadresse** (701 bis 799) wird wieder eingestellt und aktiviert; oder sie ist ohnedies noch aktiviert (wenn das Schalten der Magnetartikel von anderen Fahrpulten aus erfolgt ist).

Die betreffende Taste ("1" bis "9", wo die LED rot/grün-abwechselnd blinkt) wird kurz gedrückt; die LED leuchtet daraufhin gelb (d.h. Weichenstraßen-Kennung nun belegt).

### Anwenden (Aufrufen und Ablaufen) einer Weichenstraße:

Auch hier wird (wie beim Definieren) zunächst die Gruppenadresse (701 bis 799) eingegeben und aktiviert; dort wo

Tasten-LED gelb: Kennung belegt und Weichenstraße ausführbar.

Daraufhin wird die gewünschte Fahrstraße (1 bis 9) durch **kurzes Drücken** der betreffenden Taste aufgerufen; dadurch wird die

Tasten-LED gelb-blinkend: Weichenstraße wird ausgeführt.

Dies bewirkt das die **sofortige Ausführung**, d.h. die Weichen werden hintereinander (in Intervallen von jeweils 0,5 sec geschaltet).

