Operating instructions

ACCESSORY MODULE MX8

Versions MX8S, MX8M

1.   **Introduction**

ZIMO accessory <u>modules</u> (in contrast to accessory decoders) are <u>not</u> connected to the track; they communicate (i.e. receive commands and transmit feedback information) with the devices of the ZIMO DCC system or with a computer via the CAN Bus. The necessary power for operating turnouts and signals comes from a separate transformer, which has to be connected to the accessory module.

The accessory module MX8 ist <u>not</u> intended for use with other DCC systems than ZIMO and (if a computer is used) with no other software than STP !

There are two versions of the MX8:

MX8S for 16 turnouts with twin-coil machines or 32 single functions like signal lights (LEDs or bulbs) or decouplers.

MX8M for virtually all accessories (16 paired functions or 32 single functions) including turnouts with motor machines and EPL machines from LGB.

2.   **Specifications**

Accessory supply voltage (A.C.) ....10 - 18 V
Accessory outputs - short-time current (5 sec)..3 A
           - contineous current .... 1 A
Total current (all outputs together) .... 4 A
Time-on for accessory outputs .... 0,1 to 25 sec
Quiescent current (CAN-Bus voltage) .... ca. 25 mA
Dimensions... 172 x 112 x 40 mm....

3.   **External transformer, Ground, CAN Bus**

The accessory module MX8 contains two identical sockets (internally parallel for daisy-chaining) for CAN-Bus cables; also two terminals for an external transformer and two GROUND connectors.

Requirements for the external transformer, which has to supply the accessories connected to the MX8:

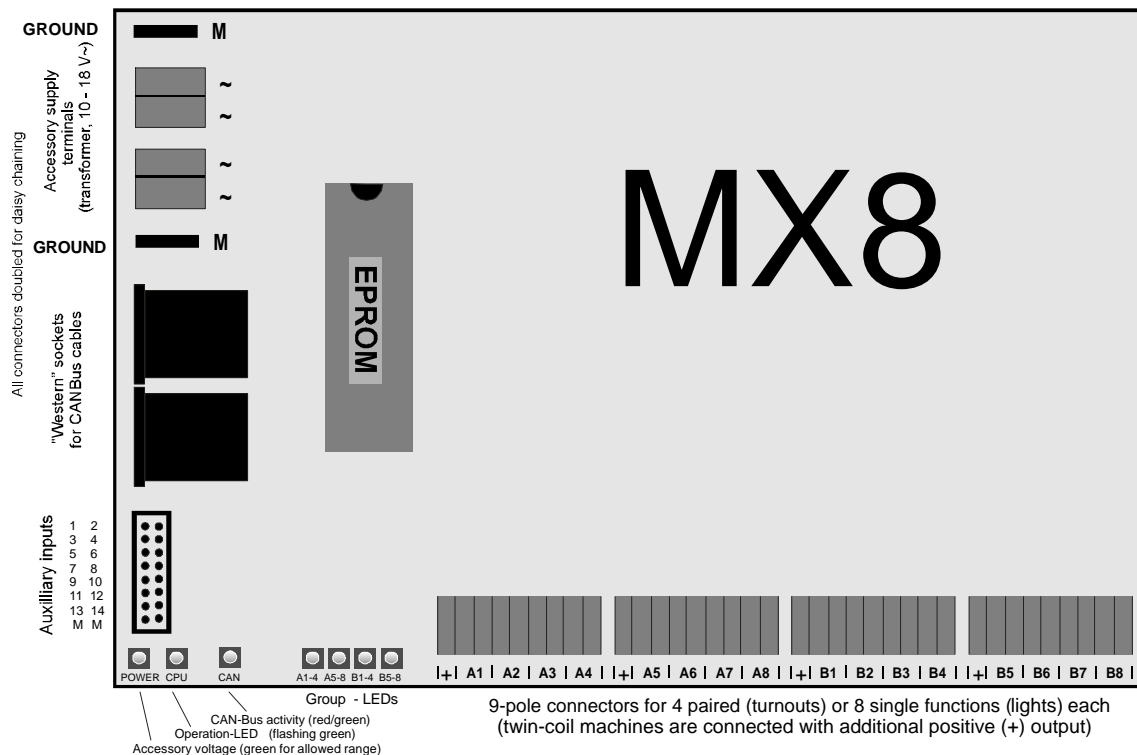**Transformer output voltage 10 - 18 V A.C.,
minimum power 30 VA**

The MX8 contains a rectifier and a capacitor, which converts the A.C. to a smooth D.C. voltage used for the accessory output drivers; this D.C. is about 20 % higher than the transformer A.C. voltage ! You should consider this in order to choose a suitable transformer.
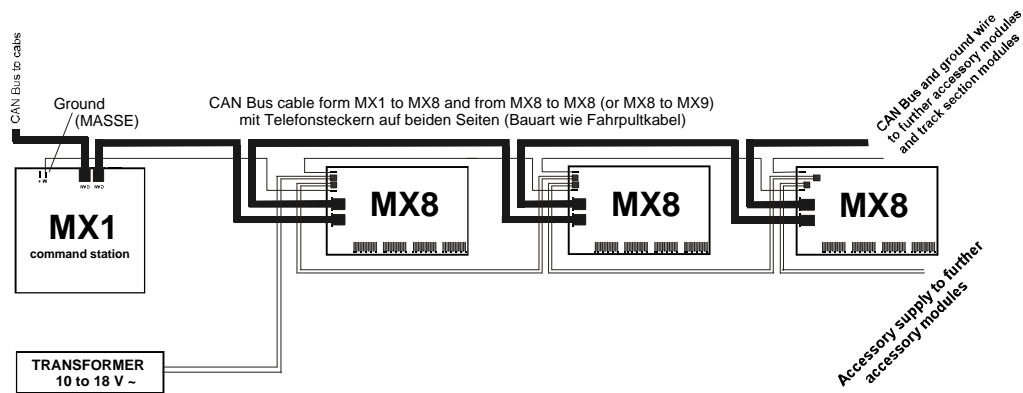
Instead of a transformer also D.C. voltage may be connected to the transformer terminal of the MX8. If this is a stabilized voltage, a maximum of 24 V is allowed (the driver outputs are about 4 V lower than the input); if not, the A.C. rules are valid.

You must not . . .

use the transformer, which supplies the command station ! Not only because this transformer has a voltage of 24 V (only 18 V is allowed for the MX8), but also because ground problems are possible.

The GROUND wiring: The ground of each MX8 has to be connected with the system ground, i.e. the ground connector ("MASSE") of the command station MX1. The two ground connectors of the MX8 allow ground wiring by "daisy chaining".

9-pole connectors for 4 paired (turnouts) or 8 single functions (lights) each
(twin-coil machines are connected with additional positive (+) output)

CAN Bus cable form MX1 to MX8 and from MX8 to MX8 (or MX8 to MX9)
mit Telefonsteckern auf beiden Seiten (Bauart wie Fahrpultkabel)

Ground
(MASSE)

CAN Bus to cabs

CAN Bus and ground wire
to further accessory modules
and track section modules

MX1
command station

MX8

MX8

MX8

TRANSFORMER
10 to 18 V ~

Accessory supply to further
accessory modules

4. **Addressing and programming**

> **Read also informations in the operating instructions for MX2, Chapter 12 !**

New MX8 modules have **address "800"**; this address is also the **"Reset and test address"**, i.e. it is the only address, which allows to assign a new address between 801 and 863 (future SW release will expand this to 899) to the module.

The address "800" provides some test features, in particular the auxiliary inputs are assigned directly to the outputs and do not follow the configuration variables # 551 to 582.

There are three operation modes for using the MX8: alternatively you can control

? **16 paired functions** (2 groups with 8 paired functions each); i.e. the first and the second 9-pole connector together make the first group, the third and fourth connector make the second group. This mode allows to control 16 turnouts or 16 simple red-green-signals (also mix of turnouts and signals is possible).

? **8 paired functions and 16 single functions** (3 groups; one group with 8 paired functions, two groups with 8 single functions each); i.e. the first and the second 9-pole connector make the first group, the third and fourth connector make the third and fourth group).

? **32 single functions** (4 groups with 8 single functions each); i.e. each 9-pole connector is a group. The typical application is to control 32 signal lights (LEDs or bulbs), which are parts of various types of signals.

?

ADDRESSING THE MX8 FROM THE MX2 CAB:

Addressing is only possible, if the MX8 contains actually the address "800" (LED "CPU" flashing, LED "CAN" flashing with half frequency) and if it is the only MX8 containing "800" on the CAN Bus. MX8 modules containing addresses other than "800" (i.e. formerly addressed modules) may be connected to the same CAN Bus.

The addressing procedure is similar to the procedure for decoders: after initiating the procedure by simultaneous pushing the "E" and the "MAN" keys the address (801 to 863 resp. 899 with future versions) is typed in and terminated by the "A" key. The addressing procedure can be left by the "E" key at any time.

If you type in only the 3-digit address (as described above) the MX8 goes into the 2-group operation mode (i.e. 16 paired functions like turnouts). Alternatively you can type in **4-digit value**, where the fourth digit is the number of groups (allowed values 2, 3, 4) and defines the operation mode. E.g. the value "813 4" means the address "813" and the operation mode for 4 groups (i.e. 32 single functions).

If the addressing is **not successful** (invalid address, invalid group number, more than one MX8 on the CAN Bus), communication problem), the MX2 display shows "Err" alternating with the address.

RESETING THE MX8 BY ADDRESSING TO "800":

Executing the adressing procedure (as described above) with address "800" results into a "**hard reset**", i.e. all configuration variables are reset to their default values. It is necessary to execute this hard reset in order to make a addressing procedure (for address 801 to 863) afterwards.

READING OUT THE CURRENT ADDRESS FROM THE MX8:

Only if the MX8 is the only one connected to the CAN Bus, you can read it out.

The addressing procedure is started by "E" and "MAN"; then "8" must be typed in and afterwards the "A" key. The MX2 display shows the MX8 address now.

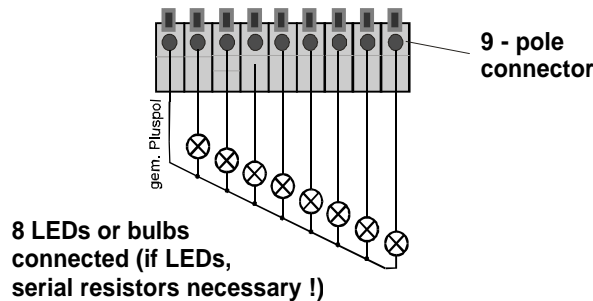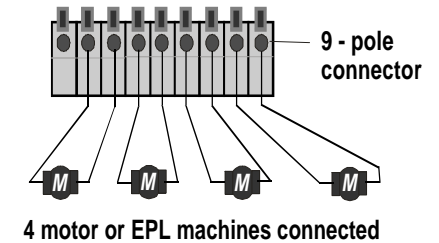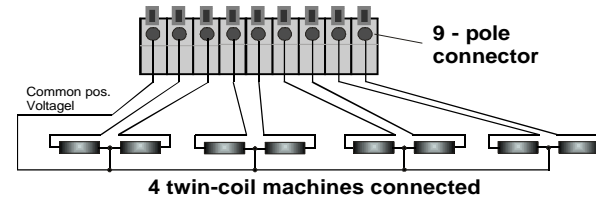PROGRAMMING AND READING OUT THE CONFIGURATIONS VARIABLES:

The configuration variables of a MX8 can be programmed and read out, also when more modules are connected to the CAN Bus at the same time.

The procedure is an extension of the addressing procedure: after starting it with "E" and "MAN" the address of the module in question must be typed in and afterwards the "C" key. Further actions are the same as for loco and accessory decoders: number of the configuration variable, "A", value, "A" for programming; number of the configuration variable, "A" and again "A" for reading-out.

Configuration variable	Meaning	Range	Default	Description
# 515 # 516 # 517 # 518	Time on	0 - 255	2	Determines the pulse for switching the turnout. Divided by 10 it gives the time in sec, so the range is 0 to 25 sec; the default value "2" means 0,2 sec, which is sufficient for most twin-coil machines). "0" means contineous mode (makes sense for signal lights, not for turnouts). Each of the four variables is valid for one of the 9-pole connectors: # 515 for the first connector, # 516 for the second one, etc.
# 546	Illumination time (only for contineous mode)	0 - 255	0	Divided by 10 it gives the time in sec (so the range is 0 to 25 sec) from starting the illumination of a signal light until it reaches full brightness.
# 547	Illumination delay (only for contineous mode)	0 - 255	0	Divided by 10 it gives the time in sec (so the range is 0 to 25 sec) from receiving a command for switch-on a signal light until the illumination is started.
# 548	Dimming time (only for contineous mode)	0 - 255	0	Divided by 10 it gives the time in sec (so the range is 0 to 25 sec) from receiving a command for switch-off a signal light until it is complete dark.
# 549, # 550 (only MX8M)	Open-Collector-mode for MX8M-outputs		0	Turn-off the p-channel transistors bit-by-bit (i.e. output-by-output). The MX8 outputs can be made completly identical to a MX8S outputs this way.
# 551 to # 582	Auxiliary inputs assignments (not on address 800 !)	0 - 14	0	Assign the 32 outputs of the MX8 (one vavriable for each output pole) to the 14 auxiliary inputs; "0" means "no input effective". If an input is assigned to an output, activating (i.e. pulling to ground) the input makes a pulse on the output (i.e. switches the turnout to that direction). .
# 583 EPROM 5.0 and higher	A.C. simulation	5 - 100	100	Duty cycle in % for the outputs; a value of 50 % is similar to an A.C. current and makes better switching for some switch machines.

5. **Connecting turnouts and signals**

Each 9-pole connector is used for 4 turnouts (paired functions) or 8 LEDs resp. bulbs (single functions). The first (very left) wire of each connector is the common positive voltage for all twin-coil machines, LEDs, bulbs, single-coils, etc. (everything exept motor and EPL machines on MX8M which do not need this).

4 twin-coil machines connected

4 motor or EPL machines connected

8 LEDs or bulbs connected (if LEDs, serial resistors necessary !)

6.　**Operating turnouts and signals**

. . . b y   M X 2   o r   M X 2 I F   c a b :

> **More information in the operating instructions for MX2, Chapter 10 !**

Address (800 to 863; with future software version expanded to 899) <u>and</u> the group number (1 or 2 resp. 1, 2, 3 resp. 1, 2, 3, 4 depending on the number of groups defined formerly in the addressing procedure) must be typed in and activated by "W" key.

The MX2 display has only 3 digits, and therefore the first digit of the address (alweays "8") is hidden. E.g.

Address 839, group 2　displayed as　39.2.

The LCD display is red; "W" is flashing (this disdinguishes MX8 operation from accessory decoder operation). With activating one group of an address other groups of that address are stored automatically in the **background memory** for accessory addresses.

Each of the **digit keys 1 to 8** operates one paired function (turnout) or one single function (decoupler, signal light) depending on the kind of the group (paired or single functions); the digit key LEDs show the actual state (red-green); for turnouts with feedback the real positions are shown (flashing during move and if a turnout does not reach the requested position).

The "E - procedure M/D" allows - for single functions - to choose between permanent or momentary operation or - for turnouts - to choose wether the digit key LEDs show the real position (from feedback) or the calculated position; the latter case should be choosen, if feedback is not possible in order to avoid flashing of the LEDs.

. . . b y   a n   e x t e r n a l   c o m p u t e r :

> **Operation instructions of "STP" !**

Operation Notes :

? The MX8 puts automatically a time interval of 0,3 sec between the start of operation of a turnout and the start of operation of the next turnout. In case of overcurrent this sequencing can be slowed down automatically.

? After power-on switching pulses are generated automatically on all connected turnouts in the directions stored at the time of power-off !

? For recognizing the actual turnout positions test pulses are made in a permanent sequence on all outputs. These pulses are very short (about 100 microsec; they do not changeturnout positions), but sometimes you can hear them.

7.　**The meaning of the LEDs on the MX8**

Green LED "POWER":　　off　-　Accessory voltage lower than 12 V
　　　　　　　　　　　　on　-　　between 12 and 24 V (suitable range)
　　　　　　　　　　　　flashing -　higher than 24 V (to high !)

Green LED "CPU":　　　flashing when MX8 is working (except coded display)

Red/green LED "CAN":　　CAN-Bus activity

Coded display of the LEDs "CPU" and "CAN":
　　Flashing "CPU", half frequency flashing "CAN" - new MX8 (address 800)
　　"CPU" off, flashing "CAN"　　　　　　　-
　　　　EEPROM problem
　　"CPU" off, triple flashing "CAN"
-　　Overcurrent

Red group - LEDs : single flash -　　shows activity on an output of this group
　　　　　　　　　　flashing　-　　Overcurrent (output of this group)
　　　　　　　　　　all groups flashing -　Overcurrent; group not yet discovered.