EDITION:
2004 04 15
2004 05 10
SW -Version 3: User updatable decoder MX82E, MX82D, MX82V
2004 08 25

Operating Instructions

ACCESSORY DECODER MX82E, MX82D, MX82V

Incomplete or not yet implemented features
(up to Software-Version 3):

- LED communication
- Back-EMF
- Position feedback without end switches
- Bi-directional communication

CONTENT:

NOTE:

ZIMO decoders contain an EPROM which stores software that determines its characteristics and functions. The software version can be read out in CV #7.

The current version may not yet be capable of all the functions mentioned in this manual. Such missing or incomplete functions can be installed later by updating the software or replacing the EPROM (only at the factory).

Beginning in October 2004, all decoders (MX82 with SW-version 3 and up) can be updated by the end user; see page 3.

Software updates are available for the end user free of charge (except for the purchase of the programming tool).
Updates and alterations performed by Zimo are not covered by any warranty.
The warranty covers hardware damage exclusively, provided such damage is not caused by the user or the connected equipment.

For update service see www.zimo.at !

1. Introduction

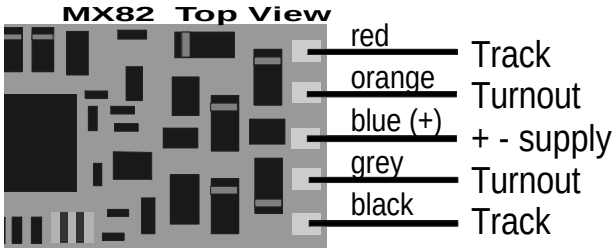
The MX82 accessory decoders operate turnouts, signals, decouplers etc. according to the ***standardized NMRA-DCC data format.*** They can be used with any NMRA-DCC system.

Accessory decoders are connected either ***to the track*** or a ***2-conductor power bus*** coming from the command station. The rather small size of the MX82 (especially the MX82E) allows the decoder to be installed inside the road bed of HO
track or switch motor housings (e.g. LGB turnouts).

Turnouts and signals connected to an accessory decoder can be operated either:

- with a cab/throttle (e.g. ZIMO MX2, MX2FU, MX21, MX21FU, MX3 etc.)
- using decoder inputs (from track contact/switches)
- with computer and appropriate software (STP-dispatching software)

MX82E	Controls ***one turnout*** with solenoid, motor or EPL drive. The shallow construction simplifies the installation in turnout housings. BEMF controlled motor drive. Additional inputs to either operate 4 servos or for train-actuated turnouts or other switches. Position feedback through ZIMO train number recognition pulses (same as MX81) or the standardized NMRA bi-directional communication ****)***
MX82D	Identical to MX82E but ***sealed*** against water intrusion.
MX82V	A "doubled-up" MX82E .78x .43x.19in (20 x 11 x 5 mm). ***2 turnouts*** or 4 signal light bulbs/LED's (also 4 Servos additionally) - bargain priced per turnout.



*) "Bi-directional communication" operational after software update, approx. End of 2004

2. Specifications

The decoder is built on a .75 x.39" board. The MX82E and MX82Vare insulated in a thin shrink tube, while the MX82D is wrapped in a slightly heavier shrink tube and sealed with a special sealer on each end.

TECHNICAL DATA:

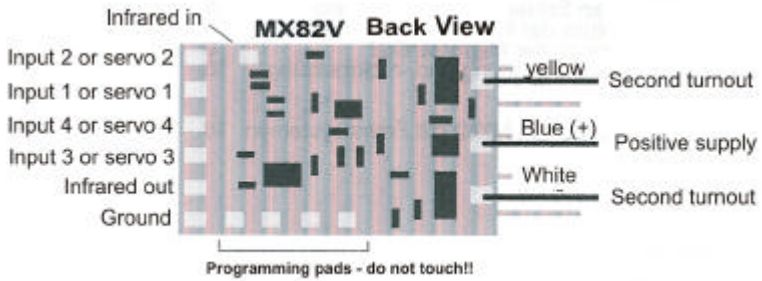
Track voltage (from track or power bus) .....12 - 24 V
Accessory output - time-limited current (turnouts) ..... 3 A
Accessory output - continuous current (signals) ..... 1 A
"On-time" for turnouts ..... 0,1 to 15 sec
Stand-by power (outputs off) ..... 10 mA
Operating temperature ..... 4 to 212 F (-20 to 100°C)
Dimensions ..... MX82E 78x.43x.12" (20x11x3mm) MX82D 86x.47x.13"
(22 x 12 x 3,5 mm) MX82V 78x.43x.16" (20 x 11 x 4 mm)

SW-Version 3 and up: UPDATE SOFTWARE ON PROGRAMMING TRACK .....

Beginning with production date September/October 2004, Zimo decoders are equipped to handle a software update by the end user. That requires a ***Zimo MXDECUP decoder update module*** (available in November 2004) as well as a computer with Windows operating system and Internet connection (for down-loading the new software from Zimo's web site).The update module is not tied to a Zimo system and can therefore be used with other DCC systems as well!

Decoders manufactured earlier (before SW-version 3) will have to be sent to Zimo for a one-time upgrade. Subsequent updates can then be performed by the user. This upgrade will be offered at a very reasonable priced service in October 2004. The decoder software can be read out with CV #519.

For more information about decoder update and the update module, please check our web site: www.zimo.at and/or future editions of this instruction manual (October 2004 and up).



OVERLOAD PROTECTION:

As is the case with all ZIMO decoders, the outputs of the MX82 are protected against excessive current draw and short circuits. Any output is turned off if an overload situation exists. After that, the decoder keeps testing the affected output, which often results in flashing lights.

Even though the decoder is well protected, do not assume that it is indestructible. Please pay attention to the following:

Faulty decoder connection; *connecting the motor leads to track power for instance or an overlooked connection between the motor brushes and rail pick-up's causes shorts that are not always recognized by the overload protection circuit and could lead to motor end stage damage or even total destruction of the decoder.*

Unfit or defective motors; *a shorted winding or commutator is not always recognized by the high current consumption it causes, because these are often just short spikes. They can lead to decoder damage, including damage to end stages due to long time exposure.*

Voltage spikes *which can be induced from motors and other loads connected to a decoder may be responsible for more decoder damage than excessive current draw. The height of such voltage spikes depends on the track voltage selected and can reach several hundred volts. They will be removed by special over voltage protection circuits but the capacity and speed of such elements is limited. Don't select a higher track voltage than what is recommended for the rolling stock used on the layout. The full range (up to 24V), adjustable with a Zimo command station, should only be utilized in special cases. Even though Zimo decoders can be operated at 24 Volts (MX62 at 20V), that is not the case if used in conjunction with some other function elements built into a locomotive.*

THERMAL PROTECTION:

All decoders covered in this manual have the ability to measure their own operating temperature. Power to the motor will be turned off once the temperature of the decoder exceeds 100^{o}C. The headlights start flashing rapidly, at about 10 Hz, so that the operator can recognize this state. Motor control will resume automatically after a drop in temperature of about 20^{o}C, typically in 30 to 60 seconds.

3. Addresses and Programming

In contrast to loco decoders, accessory decoders require not only an ***address*** but also a ***sub address*** (2 sub addresses for the MX82V). The address is required for decoder access with a cab, and the sub address determines with which function key the turnout will be operated..

Although the MX82 may be installed immediately, an address has to be assigned before it is connected to the layout wiring!

Assigning a new address is not possible with several MX82 connected in parallel to the track or power bus; if tried, all MX82 would receive the same address.

PROGRAMMING PROCEDURES:

Detailed ***procedures*** (service mode and operational mode) for programming and reading of addresses and configuration variables are found in the ***instruction manual for the cab (e.g. MX21).***

Programming is even simpler and more convenient with the help of a computer and ADaPT software (E.Sperrer, software developer)!

Programming in

"Service mode"	***"Operations mode"***
Decoder or turnout with decoder on programming track (socket: "PROG").	Decoder connected to main track. ("on-the-main", MX1 -socket "SCHIENE"),
Addresses and CV programming.	Programming of configuration variables only.
Secure programming with acknowledgement.	Programming without acknowledgement (commands are sent repeatedly, which increases reliability)
Read-out of configuration variables and address is possible.	Read-out of configuration variables is not possible. (Later possible with "bi-directional communication").
Start procedure with "E" and "MAN" keys.	Start procedure with "E" and "F" or "E" und "W".

Technical note to acknowledgment/read-out during "service mode" programming:

When programming a decoder with a cab or computer, every successful programming step will be made visible by the decoder. The same acknowledgment method is used when reading the configuration variables.

The decoder acknowledgment is carried out by briefly turning the motor and headlights on, causing short power pulses that the command station recognizes. Acknowledgment and read-out of a decoder is only successful if the current consumption is high enough, which means that the motor and headlights have to be connected or at least one of the two.

The meaning of Configuration Variables (CV's) are in part standardized by the NMRA DCC RECOMMENDED PRACTICES, RP-9.2.2. There are however certain CV's that are for Zimo decoders only, in some cases exclusively for specific types.

Always use the specifications for the decoder in question, since the value range may differ between manufacturers, even with standardized CV's; in this case ***use the table below.***

CV-Number	Name	Value range	Default value	Description
# 513 # 521 resp.: # 1, # 9	Decoder address	1 - 511	3	The accessory decoder address is spread over two configuration variables (long 9 bit); the calculation is done by the Zimo cab; the user enters and reads the complete address as a number between 1 and 511. NOTE: A sub address is necessary to operate a decoder(s).
# 514 resp.: # 2	Turnout operated by switch inputs		0	Enter value or combination thereof: 1=Input 1 activated, left 2=Input 2 activated, right 4=Input 3 activated, left (MX82V only) 8=Input 4 activated, right(MX82V only)
# 545 resp.: # 33	Sub address(es) For outputs on top side (all MX82 types) and For outputs on bottom side (MX82V only)	MX82E, MX82D: 0 - 3, 9 MX82V: 0 - 32, 99 Ones and tens digit must be of different value !!!	10 (For MX82E = "0")	Sub address(es); determine with which of the 4 function keys, F1 - F4, the accessory is actuated. ONES DIGIT: (for top outputs on MX82E and MX82D) = 0: F0 (#1 with Zimo cab) = 1: F1 (#2 with Zimo cab) = 2: F2 (#3 with Zimo cab) = 3: F3 (#4 with Zimo cab) = 9: Top outputs turned off. TENS DIGIT: (for bottom outputs, MX82V only): = 0: F0 (#1 with Zimo cab) = 1: F1 (#2 with Zimo cab) = 2: F2 (#3 with Zimo cab) = 3: F3 (#4 with Zimo cab) = 9: bottom outputs turned off.
# 515 # 516 # 517 # 518 resp.: # 3 to # 6	Power-on time	0 - 255	2	The time an accessory is powered up in 1/10 of a second (max. 25 sec. Default value "2" = 0.2 sec). Value = 0: continuous on (usually for signal lights). These CV's are tied to sub addresses in CV #545. Max. 2 of these can be set. E.g. #515 for F0, #516 for F1 etc.
# 519 resp.: # 7	Software version	Read only		This CV displays decoder software version.

# 541 resp.: # 29	Identification	Read only		Identifies the decoder as accessory decoder.
# 546 resp.: # 34	Light-up time (only when "continuous on" is selected, as in CV # 515, 516, 517 or 518 = 0)	0 - 255	10	For prototypical signal operation: Time in 1/10 of a second for a total range of 25 seconds until the light bulb reaches its full intensity.
# 547 resp.: # 35	Light-up delay (only when "continuous on" is selected, as in CV # 515, 516, 517 or 518 = 0)	0 - 255	0	For prototypical signal operation: Time in 1/10 of a second for a total range of 25 seconds until the light bulb starts to illuminate.
# 548 resp.: # 36	Dimming time (only when "continuous on" is selected, as in CV # 515, 516, 517 or 518 = 0)	0 - 255	10	For prototypical signal operation: Time in 1/10 of a second for a total range of 25 seconds until the light bulb is completely off.
# 549 resp.: # 37	Initial pulse (except for "continuous on")	0 - 255	0	Time in 1/10 of a second for a total range of 25 seconds until a switch command is sent after booting up the system or after connecting a MX82. Value= 0: No initial pulse.
# 550 resp.: # 38	Direction left - right	0 - 63	0	Value=1: for top outputs Value=2: for bottom outputs (MX82 only) Value=4: Servo 1, reverses direction Value=8: Servo 2, reverses direction Value=16: Servo 3, reverses direction Value=32: Servo 4, reverses direction Value= 0: no change in direction
# 551 resp.: # 39	Dimming (only when "continuous on" is selected, as in CV # 515, 516, 517 or 518 = 0)	0 - 255	255	When output is activated, brightness of bulb is controlled by pulse with modulation after "light-up" phase. The larger the value, the brighter the bulb. = 255: full brightness
# 552 resp.: # 40	Single (lights) or paired (turnout) functions and Position recognition (on/off)	0 - 7	0	Bit 0: for top outputs Values = 0: paired function = 1: single function Bit 1: for bottom outputs (MX82V only) Values = 0: paired function = 2: single function Bit 2: for position recognition Values = 0: off = 4: on

# 553 resp.: # 41	Address and sub addresses for Servo output 1 and 2	0 - 33 or 100 - 133	110	This CV determines whether the servos are controlled with the same address as in CV # 513, 521 or the next one higher (default!!!) and which of the 4 function keys F0 - F3 are used. ONES DIGIT values (for Servo 1): = 0: F0 (#1 with Zimo cab) = 1: F1 (#2 with Zimo cab) = 2: F2 (#3 with Zimo cab) = 3: F3 (#4 with Zimo cab) TENS DIGIT values (for Servo 2): = 0: F0 (#1 with Zimo cab) = 1: F1 ..... continue as above. HUNDREDS DIGIT values: = 0 Address as per CV # 513, 521 = 1 The servos operate on the next higher address, that is: address as in CV # 513,521 + 1.
# 554 resp.: # 42	Address and sub addresses for Servo output 3 und 4	0 - 33 or 100 - 133	132	Use as CV # 553 above but for servo outputs 3 and 4. ONES DIGIT for servo 3; TENS DIGIT for servo 4; HUNDREDS DIGIT: = 0 Address as per CV # 513, 521 = 1 The servos operate on the next higher address, that is: address as in CV # 513,521 + 1.
# 555 resp.: # 43	Motor acceleration (with pulse width modulation, only if CV #515, 516, 517 or 518 > 0)	0 - 255	0	Slow acceleration of motor drive; time in 1/10 of a second (max. 25 sec) until the motor connected reaches its full speed (according to CV #557).
# 556 resp.: # 44	Motor deceleration (with pulse width modulation, only if CV #515, 516, 517 or 518 > 0)	0 - 255	0	Slow deceleration of motor drive;time in 1/10 of a second (max. 25 sec) until the motor comes to a complete stop.
# 557 bzw.: # 45	Motor speed (with pulse width modulation, only if CV #515, 516, 517 or 518 > 0)	0 - 255	255	Maximum motor speed (after acceleration phase) by means of pulse width modulation. = 255: highest possible speed.
# 558 bzw.: **# 46**	Back-EMF	0 - 255 (Version 3 and above)	0	Severity of motor control = 0: no back-EMF

# 561 resp.: **# 49**	Servo protocol		0	= 0: Servo protocol with positive pulses. = 1: Servo protocol with negative pulses.
# **562** resp.: **# 50**	Servo 1 Left stop	0 - 255	0	Determines left stop position.
# 563 resp.: **# 51**	Servo 1 Right stop	0 - 255	255	Determines right stop position.
# 564 resp.: **# 52**	Servo 1 Rotating speed	0 - 255	30	The entered value represents the time (in 1/10 sec) needed to drive the servo between defined stops. Maximum 25 sec. Default value “30” = 3 sec (plus acceleration and deceleration times programmed in CV #565).
# 565 resp.: **# 53**	Servo 1 Acceleration and deceleration	0 - 255	20	Slow acceleration and deceleration of servo; time in 1/10 of a sec. (max. 25 sec), default value “20” = 2 sec.
# 566 as above, # 567 for # 568 Servo 2 # 569 resp.: # 54 # 55 # 56 # 57		# 570 as above # 571 for # 572 Servo 3 # 573 resp.: # 58 # 59 # 60 # 61		# 574 as above # 575 for # 576 Servo 4 # 577 resp.: # 62 # 63 # 64 # 65

TIPS and EXAMPLES of using CONFIGURATION VARIABLES:

In regards to wiring: see chapter 5 !

BASIC APPLICATIONS FOR TURNOUTS....

and also semaphores with solenoid or motor drives

As ***delivered*** (or after a ***HARD RESET***, which is accomplished with a ZIMO cab by changing the programmed address to "0" or by programming CV # 8 to 8), the most important CV's are set as follows: Main address CV # 513, 521 = 3 , Sub address CV # 545 = 10, Power-on time CV's # 515 - 518 = 2.

In case of an MX82E or MX82D (1 turnout only):
the turnout connected to the orange, grey and blue wires is operated with the F0 key (with Zimo cab use key #1) at address #3. Power is supplied for 0.2 seconds, which is common for solenoid or EPL drives.

With an MX82V for (2 turnouts):
for the first turnout see above description of the MX82E; the second turnout connected to the yellow, white and blue wires, is operated with the F1 key (because of the tens digit set in CV #545=10), with Zimo cab use Key #2.

If a ***motorized switch machine*** is used instead of a solenoid or EPL drive as above, the power-on time has to be changed accordingly (CV #515, if sub address "0" is used in CV #545). For example, if the turnout motor's switch time is 3 seconds, a value of "30" or somewhat higher should be entered.

The CV #515 is only then applicable if the sub address "0" is used in CV #545. For sub address "1" use CV #516, for sub address "2" use CV #517 and for sub address "3" use CV #518 to set power-on time.

The reason for this strange classification is that the programming is simpler when several accessory decoders are used at the same address but with different sub addresses. In such a case, each decoder has its own CV for power-on time (e.g. one uses #515, the next #516 and so on) and there is no chance that another decoder gets re-programmed unintentionally.

If ***2 motorized switch machines*** are used with an MX82V, both applicable power-on CV's (e.g. #515 and 516) have to be set to an appropriate value (e.g. "30").

In order to utilize the ***4 sub addresses,*** which are available for each accessory decoder address, several MX82 decoder (2 MX82V or 4 MX82E) have to be programmed to the same address (in CV #513, 521) but different sub addresses (CV #545).

For example:

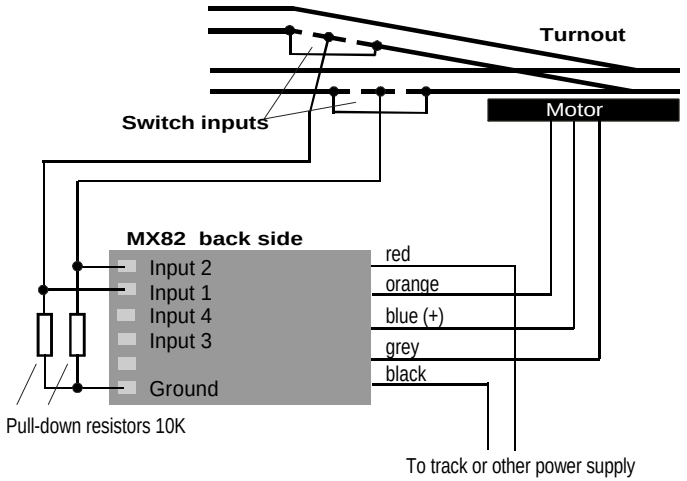
- First Decoder - MX82E: CV # 513, 521 = 25; CV # 545 = 0 (default "10" is also OK)
- Second Decoder - MX82V: CV # 513, 521 = 25; CV # 545 = 21 (that is sub addr 1 & 2)
- Third Decoder - MX82E: CV # 513, 521 = 25; CV # 545 = 03 (that is sub address 3)

The power-on times for this example - if different from the default setting of 0.1 seconds- are set as follows:

For the first decoder CV #515 = ...,
For the second decoder CV #516 = ... and CV #517 = ...,
For the third decoder CV #518 = ...

Forced turnout switching using inputs 1 to 4:

This is useful if a train should switch a turnout by itself with the help of a "switch track", reed switch etc.



The input channels have to be activated with CV #514; for the above example (Inputs 1 und 2) CV #514 = 3 would be the correct setting. The turnout can still be controlled with the cab or a computer (except during activation through the input channels).

Special input function: Applying a permanent positive voltage prevents the turnout from being switched!

NOTE: Because the same connections are used for servos or switch inputs, it is not possible to employ forced switching for servos.

SIGNALS . . .

The MX82 is most often used for ***simple red/green signals*** (2 aspect signals), which represents the same logic as for a turnout. The MX8 or MX88 would be the better, more economical choice for multi aspect signals.

There is only one difference what CV's are concerned compared to turnouts the power-on time has to be set to "0", for continuous power. Of course, the same relationship applies between the sub address and the applicable CV (#515 for sub address 0, #516 for sub address 1 and so on).

Often a ***prototypical slow signal illumination and dimming*** function is desired. The CV #546, 547 and 548 can be used to achieve this; typical values may be: CV #546 = 15, CV #547 = 10 and CV #548 = 15. Those values are applicable to all lights connected (up to 4 with an MX82V). There is no relationship between these CV's and the sub address in contrast to the "power-on" time (CV # 515-518).

If the paired function of light bulbs (2 with MX82E or 4 with MX82V) is not possible or desired and therefore ***each bulb controlled individually,*** set the appropriate Bit in CV #552 to "1" (ones digit for the orange/grey and tens digit for yellow/white wires). Naturally, the user interface (cab, command station...) may need to be configured accordingly so that single light bulbs can be controlled with ease.

ELECTRO MAGNETIC DECOUPLERS . . .

A decoupler is treated as a single function. In case of an MX82E, CV #552 is set to 1 and in case of an MX82V to 11. Mixed operation is also possible with the MX82V (orange/grey wires for a turnout; yellow/white for decoupler).

SERVOS . . .

4 logic level outputs (solder pads) are provided for the control of servos (MX82E as well as MX82V). Each of those outputs can be connected to a standard servo control input. The power for the servo (5V) is not generated by the MX82; another source is required (see chapter 5).

An MX82 can, if so desired, operate up to 4 servos ***simultaneously*** with solenoid or motorized turnouts (or signals) ***or exclusively*****.**

Attention:

The 4 servo connections are set ***to the next higher address*** by ***default*** through the CV settings #553=110 and #554=132: the servos do not operate with the accessory address stored in CV #513 and 521 but rather according to the values in CV #513 and #521 + 1. For example: If address 36 is selected, the servos operate at address 37 and Function keys F0, F1, F2 and F3.

If you wish to operate the servos with the basic address as in CV #513,521 (address 36 in this example), the CV's should be programmed to CV #553=10 and #554=32 (omitting the hundredth digit in both CV's = basic address) and #545=99 (important! This turns off the "usual" outputs for turnouts).

INFORMATION WILL BE SUPPLEMENTED LATER (List of address combinations and other experiences with servo drives).

SPECIAL FUNCTIONS for MOTO DRIVES (Switch machines). . .

INFORMATION WILL BE SUPPLEMENTED LATER!

The optional ***"Initial Pulse"*** (CV #549) is to assure that all turnouts will be in the same position after the layout is booted up, as they were before the layout was turned off. If all pulses were sent to all turnouts at the same time, the power supply could be overloaded. To prevent this, different values can be entered to CV #549 which spreads this load over a wider time frame, up to 15 seconds.

For ***continuous power output*** (mostly signal light bulbs), CV #515 (or 516, 517, 518 depending on sub address) has to be set to "0". In this mode the option of slow illumination and dimming is also available (CV #546, 547, 548), which is an especially prototypical way of signal operation.

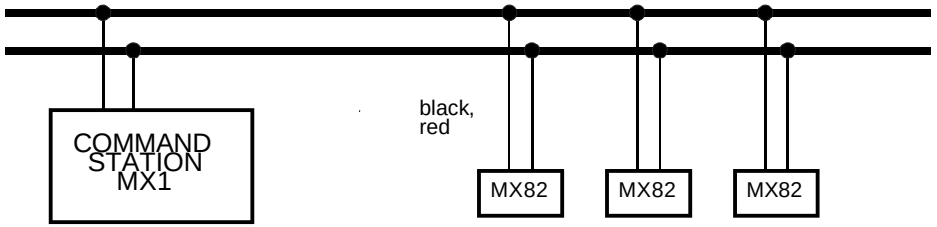
Changing CV #550, Bit 0 (Deactivation of turnout position feedback) is seldom required. This possibility is there in case somebody is sensitive to the noise generated by the turnout position recognition function but also (rather unlikely but not impossible if used with other systems) in cases where the feedback pulses could interfere with the command station or boosters (e.g. Track power turned off due to short circuit indication or distorted DCC data).

4. Connecting the MX82 to the track or a power bus

The accessory decoder MX82 is connected with the ***red and black wire*** to the track or the power bus coming from the command stations track output. Polarity is irrelevant. Any number of accessory decoders may be connected in parallel since their own power consumption is extremely low.

NOTE: Connecting the accessory decoder to the track is only practical if the track section concerned is connected itself directly to the command station or booster.

An accessory decoder must not be connected to a section of track that is connected to a track section module with occupancy detection because the small current consumption will cause the track section module to indicate an occupied track that in reality is not true.

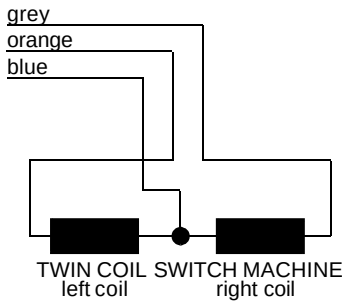


MX82 Top View

5. Connecting the MX82 to accessories

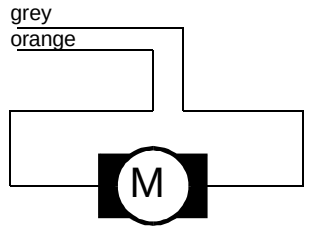
DOUBLE COIL SWITCH MACHINES AND SIGNALS:

Such accessories are connected with ***3 wires.*** The blue wire supplies the power and is connected to the common wire of the turnout and the grey and orange wires are connected to the single wires.



MOTORIZED SWITCH MACHINES AND SIGNALS:

Such units are connected with ***2 wires.*** The blue wire is not needed in this application. The other wires (grey/orange) are connected with the switch machine. The power-on time has to be programmed with CV #515, 516, 517 depending on the sub address used.



MOTORIZED OR EPL SWITCH MACHINE

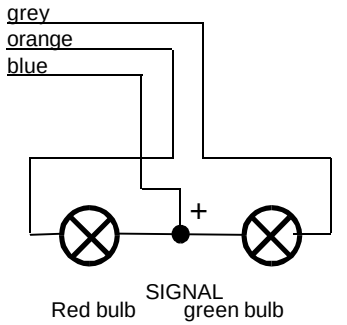
EPL SWITCH MACHINES (LGB):

EPL switch machines are electrically identical to the motorized switch machine (see above). The default power on time of .2 seconds can be left as is since the actual switch time of the EPL machine is rather short.

SIGNALS:

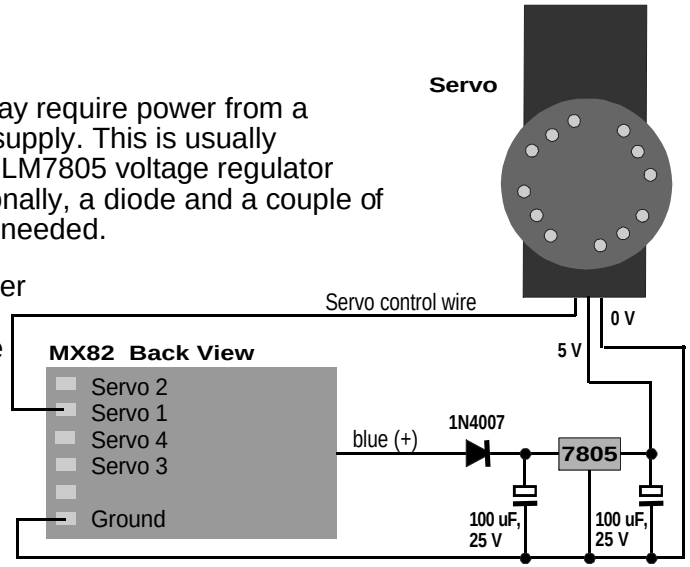
Commercially available signals have a common wire that connect to the blue wire (positive) of the decoder. The single wires are connected with the orange and grey wire.

Pay attention to polarity in case of LED's (only signals with common anode) and use an appropriate resistor (usually 1Kohm).



SERVOS:

Most servos sold today require power from a regulated 5V power supply. This is usually accomplished with a LM7805 voltage regulator or equivalent. Additionally, a diode and a couple of condensers are also needed.



Normally such a power supply can be fed through the blue wire coming from the decoders internal regulator, as shown in this drawing.

However, if the peak current draw of the servo exceeds 1 amp, an external rectifier connected directly to the track should be used instead (Important: Make sure that all ground points (decoder, servo and regulator) are connected with each other!).

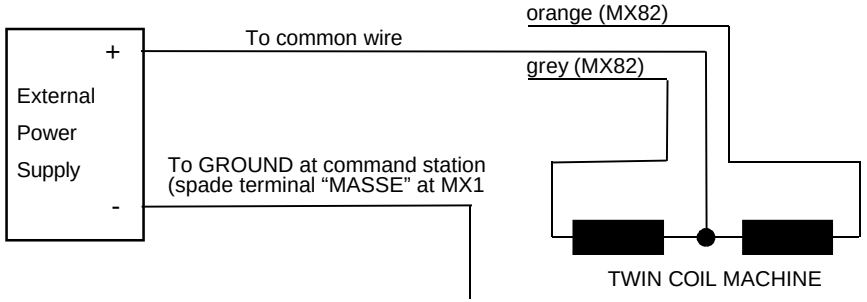
The control wire between the decoder and the servo *should not* contain any electronic components, such as protective or pull-up resistors!

External power supply for twin coil switch machines

In some applications the track voltage may not be suitable for operating turnouts. The problem may be caused by too low of a track voltage or a switch machine that is designed to work on AC only. N gauge switch machines from Arnold and some of Roco's are well known for this problem.

A possible solution may be found

- in using a power supply that supplies an unfiltered DC voltage (its effect is similar to AC and meets the "natural" requirements of many such machines). For example, an old-fashioned (non-electronic) model railroad power pack may be used. But pay attention that only the DC output is suitable. Under no circumstances should the AC output be used ! An ordinary transformer (e.g. 16 - 18V output) with a rectifier added can also be used instead of a model railroad power pack.
- The positive wire of this supply is connected to the common wire of the twin coil machine. The other coil wires are as usual connected to the grey and orange wire of the MX82. The ground wire of the external power supply must be connected to the system ground (spade terminal "MASSE" of the MX1 command station).



6. Operating accessories

. . . with a MX2, MX2FU, MX21 or MX21FUcab:

Enter the MX82 ***address*** and ***activate*** with keys "W" or "A" (the "A" key can be used if this address was already used as accessory address in the past).

The display is illuminated ***red***, as it always is when the accessory mode is active.
An additional reminder is the "W" in the display.

See instruction manual for the Zimo cab, MX2, MX21 etc.!

. . . With a computer:

See "STP" instruction manual !

7. Position recognition and feedback

The accessory decoder MX82 is equipped with a feedback mechanism that is based on the ZIMO train number recognition. “Switch pulses” are sent to the track if switch machines with end switches are used, from which an appropriately equipped command station is able to learn the turnout position and subsequently send that info along to the cab and computer.

However, the necessary hardware for the MX1 command station as well as the software were not available at the time this instruction manual went to print. It is not clear at this point either whether the turnout position will be checked only after the turnout is operated or a permanent supervision is possible as is the case with the MX8 accessory module (so that a manual intervention is also recognized).

Using the MX82 with other DCC systems

Because the MX82 accessory decoder is ***fully NMRA-DCC compatible,*** it can be used on layouts operated by other compatible systems as well. This is the case, among others, with “Digital plus” (Lenz) and Digitrax.

MX82 with Lenz “DIGITAL plus” Software-Version 2.0 or newer:

With this system number 1 - 255 can be used to operate turnouts. These numbers are arranged to addresses and sub addresses as follows:

Turnouts 1 - 4 at the LENZ cab: MX82-address 1, Sub address 0 - 3
Turnouts 5 - 8 at the LENZ cab: MX82-address 2, Sub address 0 - 3
Turnouts 9 - 12 at the LENZ cab: Address 3 (DEFAULT !), Sub address 0 - 3 and so on.

If, for example, an MX82 is to be operated with number 10, the value for the address in CV #1 must be “3” and the value for the sub address in CV #33 must be “1”.

If the MX82 servo outputs are used, note that these are assigned by default to the next higher address than the programmed decoder address.

For example:

Servo outputs at the LENZ cab are controlled with
13 - 16, with a programmed MX82 address 3 (default)
17 - 20, with a programmed MX82 address 4

and so on.

To be able to program a decoder, enter the programming mode, then the CV mode with the cab. Possible error messages (”Err 2”) due to missing acknowledgments (which depends on the accessory connected to the MX82) can be ignored.

MX82 with LGB:

Here as well, turnouts are not arranged in addresses and sub addresses but rather numbered; practically the same as with the Lenz system (see above).

Select the accessory mode at the 55015 Universal Handy with keys F and 1. The turnout address starts at 1, where:

Turnout 1: CV1=1, CV33=0
Turnout 2: CV1=1, CV33=1
Turnout 3: CV1=1, CV33=2
Turnout 4: CV1=1, CV33=3
Turnout 5: CV1=2, CV33=0
Turnout 6: CV1=2, CV33=1
etc.

Switch turnouts with left and right arrow keys.

MX82 with Intellibox :

Intellibox also numbers the turnouts like the Lenz system does (see above).