

MODELLBAHN DIGITAL PETER STÄRZ

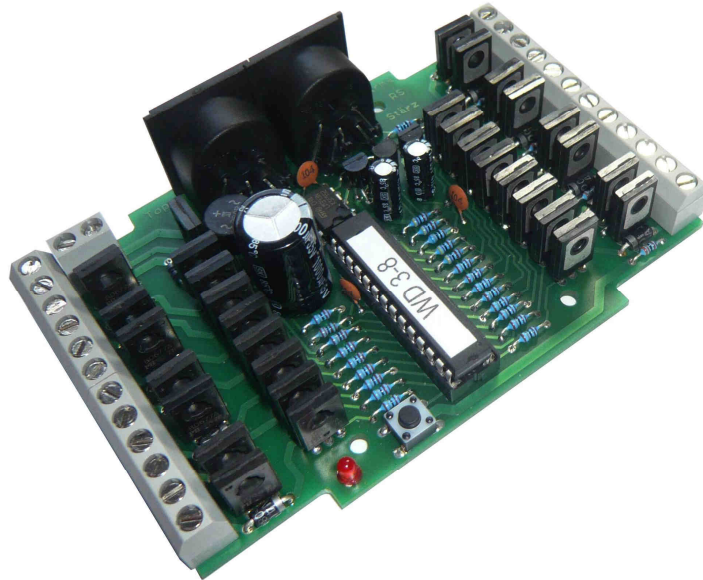
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Accessory decoder for Selectrix®

WDMiba 3
v5-2010

for 8 turnouts, signals, uncouplers, relays



Degree of difficulty: **easy**
average
difficult

Required capabilities:

- Easy assembling and soldering of the PCB

The accessory decoder WDMiba is an output device for controlling 8 turnouts, semaphores, light signals, uncouplers or relays of a Selectrix-controlled model railway layout.

Solenoid based consumers (**additional recovery diodes are required!**) are powered by pulsed current. Light signals are powered by continuous current. To power accessories with electric motors the extension kit ESMot has to be populated.

The accessory decoder's SX bus address and its settings (pulsed or continuous current) can be configured through SX bus individually for each of the 8 output channels.

When (re-) powering the Selectrix bus, the accessory decoder feeds back its last state (position of the turnouts etc.) to the central unit.) before the system was switched off the last time.

Special features

- Especially for Selectrix®
- Further improved reliability by using input comparators at the SX bus
- Population option for motorized consumers already foreseen (ESMot) – no additional PCB is required
- Space for series resistors for LEDs already included on PCB

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Technical specifications

Size

104,6mm x 73,9mm x 30mm

Power Supply

The accessory decoder WDMiba requires a suitable external power supply according to the requirements of connected accessories.

The following values should not be exceeded:

Alternating current:	16V
Continuous current:	22V

Our transformer with 16V AC, 70W output is recommended.

Output current

Pulsed current: 2A each output, max. 4A combined
Continuous current: 1,5A each output, max. 1,5A combined

Connections

2s SX-Bus jacks
2x terminals for power supply
8x 3 terminals for 8 turnouts, light signals, etc.

Switch/Display

Push button and a status LED to switch to programming mode

Plugging to SX-Bus

The module is connected to the SX-data-bus via an (optional) SX-bus cable.

For large layouts with long cables an additional ground wiring of the SX-bus is suggested. Use terminal GND for that purpose.

Asynchronous rail and control bus may lead to flickering of the occupancy detection. Increase response delay and dropout delay to override this effect.

The module must never be connected to the Selectrix-Power-Bus (PX-bus)!

Bus cables may only be plugged or unplugged at power down of the model railway layout.

Assembly notes

The module is assembled following the instructions on the next page. For soldering the components on the PCB a soldering iron of 12 to 25 Watts or a soldering station with the temperate set to approx. 400°C is needed together with 0.5 or 1.0 mm soldering wire with rosin flux. No special tools are required. Do not use soldering flux! Pay attention to solder speedily to avoid device damage by overheating.

Non-Use

When the module is not used it should be stored at a dry and clean place.

The Instruction

The full content of the instruction is important. Very important information is marked in **colours**; critical information is highlighted in **red**. A recommended value for any setting is marked with an (*).

Installation site

The module should be located in a dry, ventilated and clean area being easily accessible and lying beside or next to the model railway layout.

The module must be kept free of coarse dirt or electro conductive parts falling down.

The module may be arranged without a housing needed. In that case the module shall be put on an insulating sub floor by means of the plastic spacer rings and screws delivered.

Keep all electro conductive tools, assembly kits and cables away from the module during operation.

A negligently and by external circumstances caused short-circuit (impinging on the module from above or from the bottom) may destroy the module. If that happens, all terms of warranty will become invalid.

Update

The heart of the module is a PIC that stores the software. A socket for the PIC provides easy access for the purpose of any software update.

Never use other PICs than those dedicated to this module. Disregarding may lead to destruction of the module and all term of warranty will become invalid.

Kit contents

Please first verify that the kit contains all the components listed below.

General parts:

1x circuit board
1x LED red
1x voltage regulator 78L05
1x rectifier B80C1500 (or similar)
1x push button
1x SX-Bus cable
4x spacer rings
4x screws

Connectors:

2x SX jacks
2x terminals 2-pinned
8x terminals 3-pinned

ICs:

2x 74HC259
1x 28-pinned socket for PIC
1x PIC "WD3"

Transistors:

16x BD677
1x BC547B
1x BC557B

Capacitors (marking):

2x ceramic 100nF (104Z)
2x electrolytic 47µF
1x Electrolytic 1000µF

Resistors (marking):

4x 22kOhm (red, red, black, red, brown)
16x 1,8kOhm (brown, grey, black, brown, brown)
4x 4,7kOhm (yellow, lilac, black, brown, brown)
1x 2,2kOhm (red, red, black, brown, brown)
1x 680Ohm (blue, grey, black, black, brown)
3x 100Ohm (brown, black, black, black, brown)

Extension kit ESMot (2 kits for all 8 outputs, as optional accessory):

16x transistors BD677
16x diodes 1N4001
16x 3,3kOhm (orange, orange, black, brown, brown)

Maintenance and care

Dust clumping together can, in combination with condensating liquids, become conductive and deteriorate the functionality of the module. It is therefore important to remove dust regularly by blowing it off or vacuuming the module.

CAUTION: A liquid cleaning of the part is prohibited!

Accessory and expendabilities

The following equipment is available:

Housing:

- **Housing for WDMiba: G 523 E** **Art. 285**

Accessory:

- **Recovery diodes** **Art. 208**

To control uncouplers and turnouts without end position detectors, additional recovery diodes (SMD) must be installed.

These are soldered on the bottom side of the PCB after all other components have been populated, according to the drawing on the next page (bottom side of the PCB).

Expendabilities:

- **Extension kit ESMot** **Art. 318**

Allows the connection of 4 motor-powered turnouts. To enable all 8 outputs for motor-powered turnouts 2 accessory kits ESMot are required.

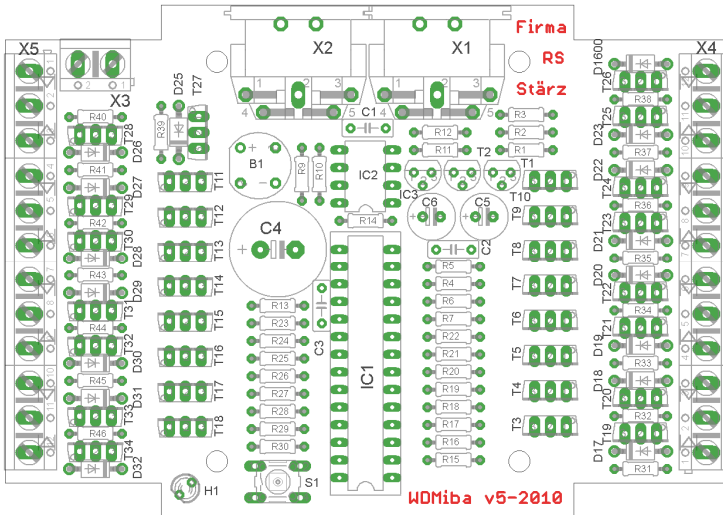
Please also visit our FAQ page at www.firma-staerz.de for any question first.

Assembly instructions

Assemble the kit in the order of these instructions. All components are placed on the top side of the PCB (marked "top") as close to the PCB as possible and soldered on the bottom side of the PCB (marked "Bottom"). Use a bending tool (e.g. Conrad 425869 – 62) for bending. Cut the leads of components flush using a wire cutter after soldering.

Solder cleanly and precisely!

Component layout diagram on the PCB



Populated PCB



1. Resistors

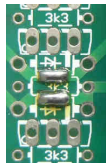
Bend the resistor leads for 7.5 mm pitch before insertion. To facilitate placing components on the PCB support the edges of the board with the help of two books, for instance, to leave enough space for the leads under the board. Insert the resistors on board aligning the coloured rings of all the resistors in the same way to make it easier to verify the value of the resistors later. Place a suitable plane piece of wood or similar on top of the resistors on board. Turn the board together with the wood upside down. The underside of the board is now conveniently accessible for soldering the components.

Solder one end of each resistor first and check that they are positioned properly before soldering the other end of each resistor.

R1 - R3:	100Ohm	(brown, black, black, black, brown)
R4 - R7:	4,7kOhm	(yellow, lilac, black, brown, brown)
R9 - R12:	22kOhm	(red, red, black, red, brown)
R13:	2,2kOhm	(red, red, black, brown, brown)
R14:	680Ohm	(blue, grey, black, black, brown)
R15 - R30:	1,8kOhm	(brown, grey, black, brown, brown)
(R31 - R46):	3,3kOhm	(orange, orange, black, brown, brown)

2. (Solder bridges)

If the Extension kit ESMot is not used, first set all 16 solder bridges at their dedicated places on top of the PCB. **Alternatively at these placeholders for the diodes, the required series resistors for LED signals may be populated here.**



3. (Diodes)

The diodes of the Extension kit ESMot are mounted with the cathode (marked with a stripe) to the inner side of the PCB.

D17 – D32: 1N4001

4. IC, Socket for PIC

Place and solder the PIC socket and ICs with the notches according to the component layout diagram on the PCB.

IC2: LM393

Socket: Socket for PIC

5. Push button

Place on the reserved spot accordingly and solder.

6. LED

The cathode of the LED is to be placed to face the corner of the PCB. The shorter lead of the LED is the cathode and the collar is also flat on the cathode side.

7. Ceramic capacitors

C1, C2: 100nF (104)

8. Voltage regulator, transistors

The transistor and the voltage regulator can be placed simultaneously when proceeding similar to the resistors. Do not confuse the transistors with the voltage regulator 78L05!

T1: BC547

T2: BC557

IC3 78L05Z

9. Terminals

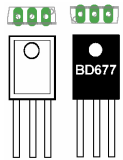
Row up the terminals for X4 and X5 before soldering!

X3: 2-pinned terminal

X4 - X5: 3-pinned terminals

10. Transistors

Pay attention to the orientation: Transistors T3 to T10 (and T19 to T26) are installed with their metallic side (metallic shiny or black without marking) facing the label "WDMiba v5-2010", T11 to T18 (and T27 to T34) in the opposite direction.



11. Rectifier

The rectifier has to be placed in the same height as the transistors. Watch out the polarity.

B1 B80C1500

12. Electrolytic capacitors – Watch polarity!

The shorter lead is the negative pole and must be facing to the right.

C5, C6: 47µF

C4: 1000µF

13. SX-bus jacks

Solder the shielding (big pads) of the jacks generously.

14. Verification and mounting the PIC

After soldering all components on the PCB verify once more that they are placed according component layout diagram and that they are oriented properly. Check that all solder points on the bottom side of the PCB look correct. Note especially if there are any undesired solder bridges between solder pads.

After the verification the PIC can be mounted:

IC1: PIC "WD3"

15. (Recovery diodes)

According to the drawing on the right, the recovery diodes are soldered with their cathodes (stripe) to the common (b) pole.



Description of operation

Operating principle of the Accessory Decoder

The Accessory Decoder WDMiba permanently reads the information of its dedicated address at the Selectrix-Bus and switches its dual-port-outputs (one port for position "on", one port for position "off") according to the given bus information.

Depending on the operation mode the outputs are set: For each output, one of two timers can be assigned. According to the setting of the timer used, the outputs are powered with pulsed current for the time specified by the timer, or by continuous current.

Bringing into service

The address of the Accessory Decoder WDMiba, both timers and the timer assignment for each output are programmed through the SX bus. In order to do so, a controller, e.g. a central unit ZS1, a controller unit SPF-PIC or a (bus)-interface with corresponding computer programme are required.

After plugging Accessory Decoder WDMiba to the SX bus, these parameters can be set.

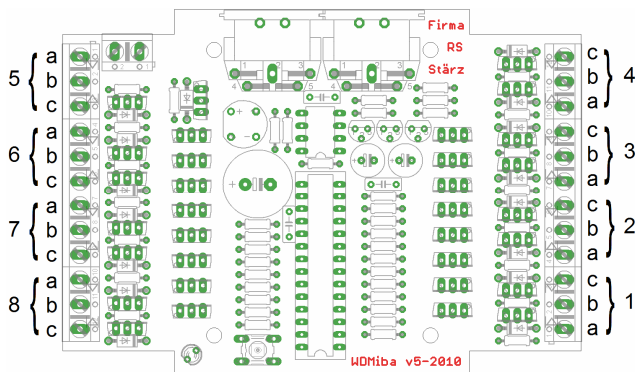
During programming of the Accessory Decoder WDMiba the bus addresses 0 to 3 will be used temporarily. That means during programming the contents of these addresses will be changed.

Connection of solenoid accessory and light signals

The power supply voltage must be chosen to fit the requirements of connected accessories:

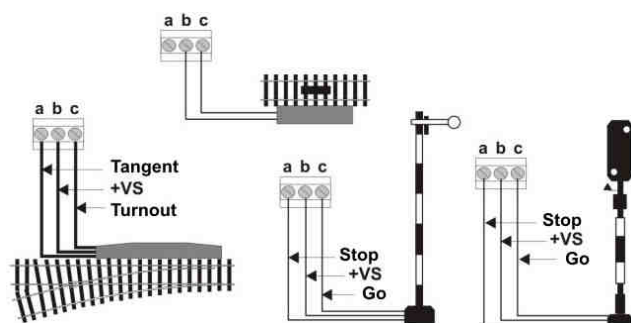
Turnouts, semaphore signals and uncouplers with coils accept maximum 16V alternating current. Light signals will need a somewhat lower voltage since the actual output voltage after the smoothing capacitor of the rectifier circuit is 1.4 times the voltage of the input alternating current. Light signals equipped with LEDs designed for 16 V AC should be fed with either 11 V AC or the value of the LED resistor should be increased respectively.

Output numeration of the Accessory Decoder WDMiba



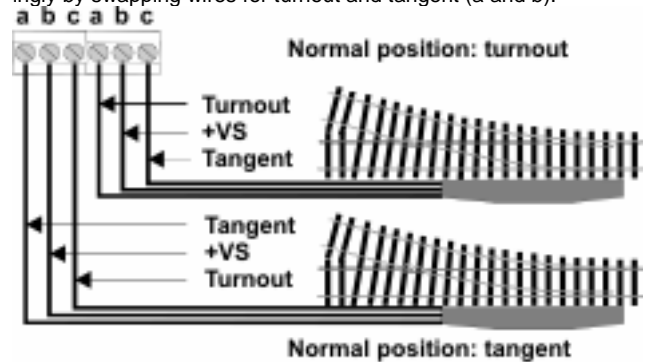
Connections of output channels

Pin	Turnout	Signal	Uncoupler
a:	Tangent	Stop	Not used
b:	+ VS	+ VS	+ VS
c:	Turnout	Go	Activate



Normal position for turnouts

The usual way is to connect turnouts with their normal position to be the tangent position. If, however, the main line direction is in turnout position, the turnout can be wired to the decoder accordingly by swapping wires for turnout and tangent (a and b).

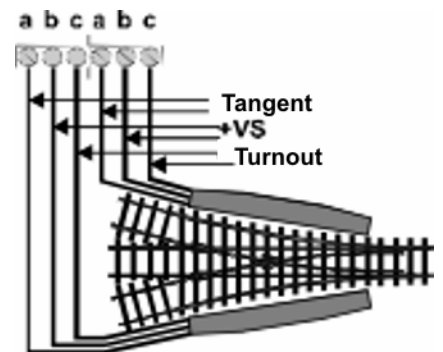


Turnouts wired in tandem

Using maximum two turnout tracks in tandem is possible and useful e.g. for hopping tracks. Make sure that the two motors are identical.

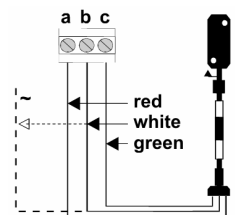
Three-way turnout

A three way turnout is wired like two individual normal turnouts connected to two accessory decoder output channels. Before switching to turnout position, the opposite side might have to be switched to tangent position.



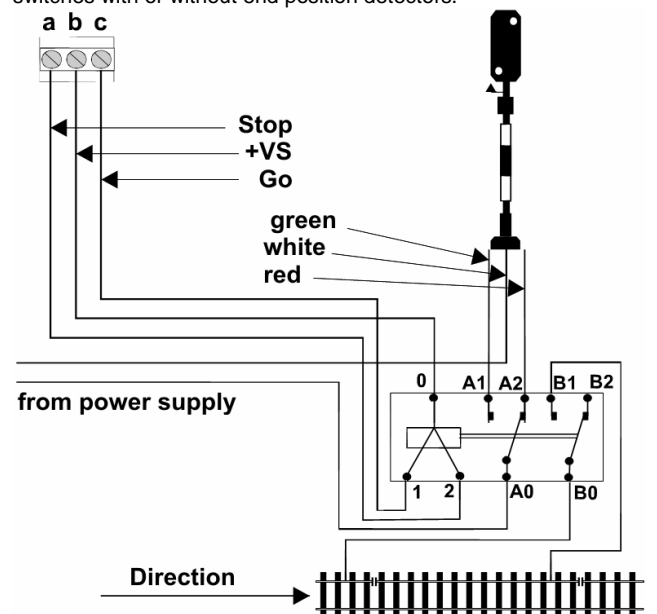
Light signal

Set the decoder output channel for continuous current. In order to avoid too high voltage over signal lamps, the common terminal (white) can be alternatively connected to decoder's power connector for AC.



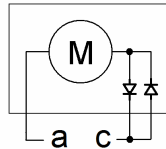
Light signal with train affection

Usually a remote control switch (relay) with two changeover switches is used with light signals for train affection. Remote control switch is connected to the outputs of a decoder channel. The switch controls signal lights and track current. Set the decoder channel to operate in pulsed current mode for remote control switches with or without end position detectors.



Connection of motorized turnouts

When connecting motorized turnouts, the extension kit ESMot must be populated (for the concerned outputs). Basically the connection of all motorized turnouts is the same: Both contacts of the motor are directly connected to the outputs of the Accessory Decoder WDMiba, each at terminals a and c – terminal b is left unconnected.



Some vendors of motorized turnouts equip their motors with an additional circuitry (in most cases two diodes) which leads to more than just two contacts. Usually there is one common ground (or voltage supply) which is to be connected to terminal a. Additionally there should be a contact for each turning direction which are to be both connected to terminal c. There might be further wires but they are not of interest for the connection to the Accessory Decoder WDMiba.

Parameters and Programming

Programming

By programming the address of this module and all further parameters are set. In this section all parameters are explained. Refer to the last page of these instructions for an example for the programming procedure.

Convention Bit and Key

In information technology "Bit 0" to "Bit 7" is common. For model railroaders a numbering of "bit 1" to "bit 8" is much more convenient, as "Bit 1" becomes equal to "Key 1" or "position 1". This convention is used in these instructions.

Overview of parameters

- Address 0: Address of this module** **1 to 103 / 111 (80)**
see table of addresses
- Address 1: Timer assignment):**
Bit value 0 (Off, "0" or "-") assigns timer 1
Bit value 1 (On, "1" or "/") assigns timer 2
- Address 2: Timer 1** **1 to 254, 255 (16)**
Pulse length: 1 to 254: (80ms increments)
Continuous current: 255 (all bits 1)
Factory setting: 16 = pulse length 1.2 seconds.
- Address 3: Timer 2** **1 to 254, 255 (255)**
Pulse length: 1 to 254: (80ms increments)
Continuous current: 255 (all bits 1)
Factory setting: 255 = continuous current

Address of this module

The address of this module can be set to any value in the range from 1 to 111. Note that at certain central units addresses 104 to 111 are reserved for internal purposes during operation and should thus not be used.

Also, addresses 0 to 3 are often used for programming parameters of modules. Therefore these addresses should also not be used.

Operation mode

The Accessory Decoder WDMiba offers 2 operation modes: Pulsed current and continuous current.

To allow controlling accessory types with different current requirements, for each of decoder's eight output channels one of two timers can be selected individually. Both timers (1 and 2) can have either a pre-determined pulse length value or set to continuous current.

Operation mode pulsed current

The operation mode pulsed current enables the output current only for a specific time (set by the timer) after switching to this direction. Afterwards, the output is off.

Not all solenoid powered accessories have the same requirements for the duration of pulsed current to operate them. For instance, a turnout with a double solenoid and limit stop can usually be operated with a 0.5 to 1 second pulse length. Theoretically it is possible to operate this type of turnout with continuous current, but if the limit stop is not working, the solenoid will get damaged. Solenoid

turnouts without limit stop should be controlled with pulses lasting 0.2 to 0.5 seconds.

On the other hand, there are slowly moving turnouts and semaphore signals. These might require pulse lengths of 4 to 8 seconds.

Uncoupler tracks should as well not be operated with continuous current. Instead, select a pulse with a length of up to 20 seconds for uncouplers.

Operation mode continuous current

The operation mode continuous current enables the output current permanently, so one of the dual-port outputs is always active.

For a light signal an output of continuous current is required which lights up red on Stop but lights up green on Go instead. Only one of the two lights is activated at the same time.

Timers 1 and 2

Both timers of the Accessory Decoder WDMiba are equal which means that they can be programmed independently to any pulse length between 0.08s (80ms) and 20 seconds with 80ms increments, by selecting values from 1 to 254. Both timers can also be set to identical pulse lengths or continuous current mode (by programming value 255).

For each of the 8 decoder output channels one of those 2 timers is assigned.

Timer 1 is assigned for all output channels where operation mode 0 is selected; timer 2 is assigned for all output channels where operation mode 1 is selected, respectively.

Overview of timers

The pulse length is calculated by summation of the separate bit values (1 to 254) multiplied with the increment (0.08 s = 80 ms)

Bit	1	2	3	4	5	6	7	8
Value	1	2	4	8	16	32	64	128
Pulse	0,08	0,16	0,32	0,64	1,28	2,56	5,12	10,24

Value 255 (all bits ON) selects continuous current.

On the next page you'll find a table with some examples.

Delayed output

In computer controlled and other automatic layouts several turnouts or signals are typically switched simultaneously. This could result in excessive power consumption which exceeds the output capacity of the decoder.

To prevent problems due to current peaks decoder outputs configured for pulse type outputs are activated with 80 ms delay between them when operated simultaneously. For channels set to continuous current output, there is no delay between them in simultaneous operation.

Security monitoring system

Poorly laid wiring or malfunctions of system components may result in a situation where a pulse type output is not switched off in time. This can cause overheating or even burn a solenoid connected to decoder output.

The Accessory Decoder WDMiba is equipped with a security monitoring system (Watchdog) which cuts off the output current of all output channels after about 2 seconds when an output pulse is not terminated in time normally due to SX system malfunctions.

Factory default settings

- Address of this module: 80
- Operation mode: 0 0 0 0 0 0 0 0
(all output channels use timer 1)
- Timer 1: 16 (1.28 seconds)
- Timer 2: 255 (continuous current output)

If the address of this module is set to a value greater than 111, it will be reset to the factory default setting (90).

Setting the address of this module to the value of 255 will reset all parameters to their factory default settings.

Revert back to previous settings

Entering 0 as address, response or dropout delay reverts the corresponding value to its previously programmed one.

Programming parameters e.g. with the Control Panel SPF-PIC

Preparations for Programming:

To be able to programme the parameters, the Accessory Decoder WDMiba is required to be connected to a central unit via the SX-bus cable.

Enter programming mode:

Set the central unit to STOP mode by pressing the "ZE"-key (ZE aus).

Press the programme button of the Accessory Decoder WDMiba. The module's LED activates to indicate programming mode.

Remark: Activate decimal decoding in the Control Panel to facilitate decimal conversion.

The current configuration settings are copied to channels (SX addresses) 0 to 3 of the central unit.

Enter the address of the Accessory Decoder:

Select address 00 in Control Panel. Enter switching mode by key "Adr" and enter 0, 0. The current address of the occupancy decoder is displayed, e.g. address 80:	Adr ----/-/--=080 000 12345678 aus
Enter new address of this module e.g. address 34 with keys 2 and 6:	Adr -/---/---=034 000 12345678 aus

Enter operation mode for each output channel:

Select address 01 in Control Panel. Current settings of all outputs are displayed, e.g. timer 2 selected for channels 3, 4 and 6, all the others use timer 1:	Adr --//--/--=044 001 12345678 aus
Enter new operation modes e.g. use timer 2 for outputs 7 and 8 by pressing keys 7 and 8, all the other outputs will use timer 1:	Adr -----//=192 001 12345678 aus

Enter timer 1:

Select address 02 in Control Panel. Current value of timer 1 is displayed, e.g. bit 4 on means that the time is 0.64 s:	Adr ---/-----=008 002 12345678 aus
Enter new dropout delay Enter value for timer 1 binary, e.g. 8 seconds press keys 3, 6 and 7	Adr --/--/--=100 002 12345678 aus

Enter timer 2:

Select address 03 in Control Panel. Enter switching mode by key "Adr" and enter 0, 3. Current value of timer 2 is displayed in binary, e.g. all bits are on ("1") equals continuous output current:	Adr //////////////=255 002 12345678 aus
Enter new value for timer 2 Enter value for timer 2 binary, e.g. 0,16 seconds by key 2:	Adr -/-----=002 002 12345678 aus

Exit programming mode:

Press the programme button of the occupancy detector or enable track current by pressing "ZE" at the central unit or Control Panel. The LED of the occupancy detector will blink twice for confirmation.

All parameters programmed via the addresses 0 to 3 have been stored in the registers of the Accessory Decoder WDMiba.

Table of example values for timers

Examples of bit settings for various pulse lengths (in seconds):

Bit	1	2	3	4	5	6	7	8
Value	1	2	4	8	16	32	64	128
0,4	/	-	/	-	-	-	-	-
0,8	-	/	-	/	-	-	-	-
4,0	-	/	-	-	/	/	-	-
16,0	-	-	-	/	-	-	/	/
20,0	-	/	-	/	/	/	/	/
Continuous	/	/	/	/	/	/	/	/

Address Table

Bit: Value	1	2	3	4	5	6	7	8
Address	1	2	4	8	16	32	64	128
0	-	-	-	-	-	-	-	-
1	/	-	-	-	-	-	-	-
2	-	/	-	-	-	-	-	-
3	/	/	-	-	-	-	-	-
4	-	-	/	-	-	-	-	-
5	/	-	/	-	-	-	-	-
6	-	/	/	-	-	-	-	-
7	/	/	/	-	-	-	-	-
8	-	-	-	/	-	-	-	-
9	/	-	-	-	/	-	-	-
10	-	/	-	/	-	-	-	-
11	/	/	-	/	-	-	-	-
12	-	-	/	/	-	-	-	-
13	/	-	/	/	-	-	-	-
14	-	/	/	/	-	-	-	-
15	/	/	/	/	-	-	-	-
16	-	-	-	-	/	-	-	-
17	/	-	-	-	/	-	-	-
18	-	/	-	-	/	-	-	-
19	/	/	-	-	/	-	-	-
20	-	-	/	-	/	-	-	-
21	/	-	/	-	/	-	-	-
22	-	/	/	-	/	-	-	-
23	/	/	/	-	/	-	-	-
24	-	-	-	/	/	-	-	-
25	/	-	-	/	/	-	-	-
26	-	/	-	/	/	-	-	-
27	/	/	-	/	/	-	-	-
28	-	-	/	/	/	-	-	-
29	/	-	/	/	/	-	-	-
30	-	/	/	/	/	-	-	-
31	/	/	/	/	/	-	-	-
32	-	-	-	-	/	-	-	-
33	/	-	-	-	/	-	-	-
34	-	/	-	-	/	-	-	-
35	/	/	-	-	/	-	-	-
36	-	-	/	-	/	-	-	-
37	/	-	/	-	/	-	-	-
38	-	/	/	-	/	-	-	-
39	/	/	/	-	/	-	-	-

Bit Value	1	2	3	4	5	6	7	8
Address	1	2	4	8	16	32	64	128
40	-	-	-	/	-	/	-	-
41	/	-	-	/	-	/	-	-
42	-	/	-	/	-	/	-	-
43	/	/	-	/	-	/	-	-
44	-	-	/	/	-	/	-	-
45	/	-	/	/	-	/	-	-
46	-	/	/	/	-	/	-	-
47	/	/	/	/	-	/	-	-
48	-	-	-	-	/	/	-	-
49	/	-	-	-	/	/	-	-
50	-	/	-	-	/	/	-	-
51	/	/	-	-	/	/	-	-
52	-	-	/	-	/	/	-	-
53	/	-	/	-	/	/	-	-
54	-	/	/	-	/	/	-	-
55	/	/	/	-	/	/	-	-
56	-	-	-	/	/	/	-	-
57	/	-	-	/	/	/	-	-
58	-	/	-	/	/	/	-	-
59	/	/	-	/	/	/	-	-
60	-	-	/	/	/	/	-	-
61	/	-	/	/	/	/	-	-
62	-	/	/	/	/	/	-	-
63	/	/	/	/	/	/	-	-
64	-	-	-	-	-	/	-	-
65	/	-	-	-	-	/	-	-
66	-	/	-	-	-	/	-	-
67	/	/	-	-	-	/	-	-
68	-	-	/	-	-	/	-	-
69	/	-	/	-	-	/	-	-
70	-	/	/	-	-	/	-	-
71	/	/	/	-	-	/	-	-
72	-	-	-	/	-	/	-	-
73	/	-	-	/	-	/	-	-
74	-	/	-	/	-	/	-	-
75	/	/	-	/	-	/	-	-
76	-	-	/	/	-	/	-	-
77	/	-	/	/	-	/	-	-
78	-	/	/	/	-	/	-	-
79	/	/	/	/	-	/	-	-

Bit Value	1	2	3	4	5	6	7	8
Address	1	2	4	8	16	32	64	128
(**) 80	-	-	-	-	/	-	/	-
81	/	-	-	-	/	-	/	-
82	-	/	-	-	/	-	/	-
83	/	/	-	-	/	-	/	-
84	-	-	/	-	/	-	/	-
85	/	-	/	-	/	-	/	-
86	-	/	/	-	/	-	/	-
87	/	/	/	-	/	-	/	-
88	-	-	-	/	/	-	/	-
89	/	-	-	/	/	-	/	-
90	-	/	-	/	/	-	/	-
91	/	/	-	/	/	-	/	-
92	-	-	/	/	/	-	/	-
93	/	-	/	/	/	-	/	-
94	-	/	/	/	/	-	/	-
95	/	/	/	/	/	-	/	-
96	-	-	-	-	/	/	-	-
97	/	-	-	-	/	/	-	-
98	-	/	-	-	/	/	-	-
99	/	/	-	-	/	/	-	-
100	-	-	/	-	-	/	/	-
101	/	-	/	-	-	/	/	-
102	-	/	/	-	-	/	/	-
103	/	/	/	-	-	/	/	-
(*) 104	-	-	-	/	-	/	/	-
(*) 105	/	-	-	/	-	/	/	-
(*) 106	-	/	-	/	-	/	/	-
(*) 107	/	/	-	/	-	/	/	-
(*) 108	-	-	/	/	-	/	/	-
(*) 109	/	-	/	/	-	/	/	-
(*) 110	-	/	/	/	-	/	/	-
(*) 111	/	/	/	/	-	/	/	-

(**) Factory default setting

(*) Those addresses are available with restrictions. Consult the remarks in the instructions of the central unit or SX bus extension uses.

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Printable version of 30.04.2014