VMB4RYLD-20
VMB4RYNO-20

4 channel relay module for VELBUS system

Contents

Packet Format

Binairy format:

 <SOF-SID10...SID0-RTR-IDE-r0-DLC3...0-DATABYTE1...DATABYTEn-CRC15...CRC1-CRCDEL-ACK-ACKDEL-EOF7...EOF1-IFS3...IFS1>

bits	Description
SOF	Start Of Frame (always 0)
SID10 & SID9	Priority (00: highest … 11: lowest priority)
SID8…SID1	Address
SID0	Always 0
RTR	Remote Transmit Request
IDE	Identifier Extension (always 0)
r0	reserved (always 0)
DLC3…DLC0	Data Length Code (0…8)
Databyte1	Command
Databyte2	Parameter
Databyte3	Parameter
Databyte4	Parameter
Databyte5	Parameter
Databyte6	Parameter
Databyte7	Parameter
Databyte8	Parameter
CRC15…CRC1	Cyclic Redundancy Checksum
CRCDEL	CRC Delimiter (always 1)
ACK	Acknowledge slot (transmit 1 readback 0 if received correctly)
ACKDEL	Acknowledge Delimiter (always 1)
EOF7...EOF1	End Of Frame (always 1111111)
IFS3...IFS1	InterFrame Space (always 111)

Transmit Packets

0xAB: power up message

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = 0x00
RTR = 0
DLC3...DLC0 = 2 data byte to send
DATABYTE1 = COMMAND_POWER_UP (0xAB)
DATABYTE2 = module address

0xD7: real time clock status request

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = 0x00
RTR = 0
DLC3...DLC0 = 1 data byte to send
DATABYTE1 = COMMAND_REALTIME_CLOCK_STATUS_REQUEST (0xD7)

0xD8: real time clock status

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 4 data bytes to send
DATABYTE1 = COMMAND_REALTIME_CLOCK_STATUS (0xD8)
DATABYTE2 = Day

Contents	Day
0	Monday
1	Tuesday
2	Wednesday
3	Thursday
4	Friday
5	Saturday
6	Sunday

DATABYTE3 = Hour (0…23)
DATABYTE4 = Minute (0…59)

0xB7: date status

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 5 data bytes to send
DATABYTE1 = COMMAND_DATE_STATUS (0xB7)
DATABYTE2 = Day (1…31)
DATABYTE3 = Month (1…12)
DATABYTE4 = High byte of Year
DATABYTE5 = Low byte of Year

0xAF: daylight savings status

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 2 data bytes to send
DATABYTE1 = COMMAND_DAYLIGHT_SAVING_STATUS (0xAF)
DATABYTE2 = 0 =disabled / 1 = enabled

0xFF: module type

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 8 data bytes to send
DATABYTE1 = COMMAND_MODULE_TYPE (0xFF)
DATABYTE2 = type (0x0D = VMB1RYS-20 / 0x26 = VMB4RYLD-20 / 0x27 = VMB4RYNO-20)
DATABYTE3 = High byte of serial number
DATABYTE4 = Low byte of serial number
DATABYTE5 = Memory map version
DATABYTE6 = Build year
DATABYTE7 = Build week
DATABYTE8 = Properties

Contents	Output channel
B'xxxxxxx0'	Terminator open
B'xxxxxxx1'	Terminator closed
B'xxxx000x'	Hardware version number
B'xxx0xxxx'	Velbus connection type
B'xx0xxxxx'	Only standard CAN allowed
B'xx1xxxxx'	CAN FD support

0xDA: Bus error counter status

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 4 data bytes to send
DATABYTE1 = COMMAND_BUSERROR_COUNTER_STATUS (0xDA)
DATABYTE2 = Transmit error counter
DATABYTE3 = Receive error counter
DATABYTE4 = Bus off counter

0xFE: memory data

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 4 data bytes to send
DATABYTE1 = COMMAND_MEMORY_DATA (0xFE)
DATABYTE2 = High memory address
DATABYTE3 = LOW memory address
DATABYTE4 = memory data

Remark: address range: 0x0000 to 0x07FF

0xCC: memory data block (4 bytes)

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 7 data bytes to send
DATABYTE1 = COMMAND_MEMORY_DATA_BLOCK (0xCC)
DATABYTE2 = High start address of memory block
DATABYTE3 = LOW start address of memory block
DATABYTE4 = memory data1
DATABYTE5 = memory data2
DATABYTE6 = memory data3
DATABYTE7 = memory data4

Remark: address range: 0x0000 to 0x07FC

0xCC: memory data block (5...60 bytes)(only allowed for CAN FD frames):

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = number of data bytes to send

Contents	Number of data bytes
0x09	12 data bytes
0x0A	16 data bytes
0x0B	20 data bytes
0x0C	24 data bytes
0x0D	32 data bytes
0x0E	48 data bytes
0x0F	64 data bytes

DATABYTE1 = COMMAND_MEMORY_DATA_BLOCK (0xCC)
DATABYTE2 = High start address of memory block
DATABYTE3 = LOW start address of memory block
DATABYTE4 = memory block length (5…60)
DATABYTE5 = memory data 1
…
DATABYTE12 = memory data 8 (end of data for DLC3...DLC0 = 0x09)
…
DATABYTE16 = memory data 12 (end of data for DLC3...DLC0 = 0x0A)
…
DATABYTE20 = memory data 16 (end of data for DLC3...DLC0 = 0x0B)
…
DATABYTE24 = memory data 20 (end of data for DLC3...DLC0 = 0x0C)
…
DATABYTE32 = memory data 28 (end of data for DLC3...DLC0 = 0x0D)
…
DATABYTE48 = memory data 44 (end of data for DLC3...DLC0 = 0x0E)
…
DATABYTE64 = memory data 60 (end of data for DLC3...DLC0 = 0x0F)

Remark:
Contents of unused data bytes = 0x55
Address range: 0x0000 to (0x0800 – memory block length)

0xF0: first part of channel name

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 8 data bytes to send
DATABYTE1 = COMMAND_CHANNEL_NAME_PART1 (0xF0)
DATABYTE2 = Channel 1…8
DATABYTE3 = Character 1 of the channel name
DATABYTE4 = Character 2 of the channel name
DATABYTE5 = Character 3 of the channel name
DATABYTE6 = Character 4 of the channel name
DATABYTE7 = Character 5 of the channel name
DATABYTE8 = Character 6 of the channel name

0xF1: second part of the channel name

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 8 data bytes to send
DATABYTE1 = COMMAND_CHANNEL_NAME_PART2 (0xF1)
DATABYTE2 = Channel 1…8
DATABYTE3 = Character 7 of the channel name
DATABYTE4 = Character 8 of the channel name
DATABYTE5 = Character 9 of the channel name
DATABYTE6 = Character 10 of the channel name
DATABYTE7 = Character 11 of the channel name
DATABYTE8 = Character 12 of the channel name

0xF2: third part of the channel name

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 6 data bytes to send
DATABYTE1 = COMMAND_CHANNEL_NAME_PART3 (0xF2)
DATABYTE2 = Channel 1…8
DATABYTE3 = Character 13 of the channel name
DATABYTE4 = Character 14 of the channel name
DATABYTE5 = Character 15 of the channel name
DATABYTE6 = Character 16 of the channel name

Remarks:
Unused characters contain H'FF'.

0x00: channel status

SID10-SID9 = 00 (highest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 4 data bytes to send
DATABYTE1 = COMMAND_PUSH_BUTTON_STATUS (0x00)
DATABYTE2 = Channel 1…8 just pressed (bitwise)
DATABYTE3 = Channel 1…8 just released (bitwise)
DATABYTE4 = 0 (bitwise)

	Databyte2	*Databyte3*	*Databyte4*
Ch1 just switched on	B'xxxxxxx1'	B'0000xxx0'	B'00000000'
Ch1 just switched off	B'xxxxxxx0'	B'0000xxx1'	B'00000000'
Ch2just switched on	B'xxxxxx1x'	B'0000xx0x'	B'00000000'
Ch3 just switched off	B'xxxxxx0x'	B'0000xx1x'	B'00000000'
Ch3 just switched on	B'xxxxx1xx'	B'0000x0xx'	B'00000000'
Ch3 just switched off	B'xxxxx0xx'	B'0000x1xx'	B'00000000'
Ch4 just switched on	B'xxxx1xxx'	B'00000xxx'	B'00000000'
Ch4 just switched off	B'xxxx0xxx'	B'00001xxx'	B'00000000'
Ch5 just switched on	B'xxx1xxxx'	B'xxx0xxxx'	B'00000000'
Ch5 just switched off	B'xxx0xxxx'	B'xxx1xxxx'	B'00000000'
Ch6 just switched on	B'xx1xxxxx'	B'xx0xxxxx'	B'00000000'
Ch6 just switched off	B'xx0xxxxx'	B'xx1xxxxx'	B'00000000'
Ch7 just switched on	B'x1xxxxxx'	B'x0xxxxxx'	B'00000000'
Ch7 just switched off	B'x0xxxxxx'	B'x1xxxxxx'	B'00000000'
Ch8 just switched on	B'1xxxxxxx'	B'0xxxxxxx'	B'00000000'
Ch8 just switched off	B'0xxxxxxx'	B'1xxxxxxx'	B'00000000'

0xFB: module status

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 8 data bytes to send
DATABYTE1 = COMMAND_RELAY_SW_STATUS (0xFB)
DATABYTE2 = channel 1…8 status (bitwise)
DATABYTE3 = channel 1…8 inhibited status (bitwise) (1 = inhibited)
DATABYTE4 = channel 1…8 forced on status (bitwise) (1 = forced on)
DATABYTE5 = channel 1…8 forced off (locked) status (bitwise) (1 = forced off)
DATABYTE6 = disabled channel 1…8 program status (0 = program enabled / 1 = program disabled)
DATABYTE7 = interval timer running channel 1…8 status (bitwise) (0 = interval timer not running/ 1 = interval timer running)
DATABYTE8 = alarm & program selection

Contents	Selected program
B'xxxxxx00'	None
B'xxxxxx01'	Program group 1 (Summer)
B'xxxxxx10'	Program group 2 (Winter)
B'xxxxxx11'	Program group 3 (Holiday)
B'xxxxx0xx'	Clock alarm 1 off
B'xxxxx1xx'	Clock alarm 1 on
B'xxxx0xxx'	Local clock alarm 1
B'xxxx1xxx'	Global clock alarm 1
B'xxx0xxxx'	Clock alarm 2 off
B'xxx1xxxx'	Clock alarm 2 on
B'xx0xxxxx'	Local clock alarm 2
B'xx1xxxxx'	Global clock alarm 2
B'x0xxxxxx'	Sunrise disabled
B'x1xxxxxx'	Sunrise enabled
B'0xxxxxxx'	Sunset disabled
B'1xxxxxxx'	Sunset enabled

0xF5 Clears LEDs on a linked push button module

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Address of the linked push button module for clearing LEDs
RTR = 0
DLC3...DLC0 = 2 data bytes to send
DATABYTE1 = COMMAND_CLEAR_LED (0xF5)
DATABYTE2 = LED bit numbers (bitwise) (1 = clear LED)

0xF6: Sets LEDs on a linked push button module

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Address of the linked push button module for setting LEDs on
RTR = 0
DLC3...DLC0 = 2 data bytes to send
DATABYTE1 = COMMAND_SET_LED (0xF6)
DATABYTE2 = LED bit numbers (bitwise) (1 = set LED)

0xF7: Blinks LEDs slowly on a linked push button module

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Address of the linked push button module for slowly blinking LEDs
RTR = 0
DLC3...DLC0 = 2 data bytes to send
DATABYTE1 = COMMAND_SLOW_BLINKING_LED (0xF7)
DATABYTE2 = LED bit numbers (bitwise) (1 = slow blink LED)

0xF8 Blinks LEDs fast on a linked push button module

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Address of the linked push button module for fast blinking LEDs
RTR = 0
DLC3...DLC0 = 2 data bytes to send
DATABYTE1 = COMMAND_FAST_BLINKING_LED (0xF8)
DATABYTE2 = LED bit numbers (bitwise) (1 = fast blink LED)

0xC1: program step info

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 8 data bytes to send
DATABYTE1 = COMMAND_PROGRAM_STEP_INFO (0xC1)
DATABYTE2 = Program step number (1…122 / 255 step not found)
DATABYTE3 = Program reference

Contents	Description
000xxxxx	Disable program step
001xxxxx	Absolute time
010xxxxx	Wake up time 1 + relative time
011xxxxx	Go to bed time 1 + relative time
100xxxxx	Wake up time 2 + relative time
101xxxxx	Go to bed time 2 + relative time
110xxxxx	Sunrise + relative time
111xxxxx	Sunset + relative time
xxx01111	Rel. time = 3h45min
…	
xxx00001	Rel. time = 15min
xxx00000	Rel. time = 0
xxx11111	Rel. time = -15min
…	
xxx10000	Rel. time = -4h

DATABYTE4 = Program step month & four least significant bits of day

Contents	Description
xxxx0000	Weekly program
xxxx0001	January
xxxx0010	February
xxxx0011	March
xxxx0100	April
xxxx0101	May
xxxx0110	June
xxxx0111	July
xxxx1000	August
xxxx1001	September
xxxx1010	October
xxxx1011	November
xxxx1100	December
xxxx1101	Monthly program
xxxx1110	Monthly program
xxxx1111	Monthly program

Contents byte6	Contents byte4	Description
00xxxxxx	0000xxxx	Never
00xxxxxx	0001xxxx	Day 1of the month
00xxxxxx	0010xxxx	Day 2of the month
…	...	…
01xxxxxx	1111xxxx	Day 31of the month
10xxxxxx	0000xxxx	Never
10xxxxxx	0001xxxx	Every Monday
10xxxxxx	0010xxxx	Every Tuesday

...	…	…
10xxxxxx	0111xxxx	Every Sunday
10xxxxxx	1000xxxx	Every weekend (sa & su)
10xxxxxx	1001xxxx	Every working day (mo…fr)
10xxxxxx	1010xxxx	Every day except Sunday
10xxxxxx	1011xxxx	Every day
10xxxxxx	1100xxxx	Never
…	…	…
11xxxxxx	1111xxxx	Never

DATABYTE5 = Program step hour & group number

Contents	Description
xxx00000	0h
xxx00001	1h
…	…
xxx10111	23h
xx1xxxxx	Program group 1 (Summer program)
x1xxxxxx	Program group 2 (Winter program)
1xxxxxxx	Program group 3 (Holiday program)

DATABYTE6 = Program step minute & every flag & msb of day

Contents	Description
xx000000	0min
xx000001	1min
…	…
xx111011	59min

Contents byte6	Contents byte4	Description
00xxxxxx	0000xxxx	Never
00xxxxxx	0001xxxx	Day 1of the month
00xxxxxx	0010xxxx	Day 2of the month
…	...	…
01xxxxxx	1111xxxx	Day 31of the month
10xxxxxx	0000xxxx	Never
10xxxxxx	0001xxxx	Every Monday
10xxxxxx	0010xxxx	Every Tuesday
...	…	…
10xxxxxx	0111xxxx	Every Sunday
10xxxxxx	1000xxxx	Every weekend (sa & su)
10xxxxxx	1001xxxx	Every working day (mo…fr)
10xxxxxx	1010xxxx	Every day except Sunday
10xxxxxx	1011xxxx	Every day
10xxxxxx	1100xxxx	Never
…	…	…
11xxxxxx	1111xxxx	Never

DATABYTE7 = Program step action

Contents	Action
248	On
249	Off
250	Forced Off
251	Cancel Forced Off
252	Forced On
253	Cancel Forced On
254	Inhibit
255	Cancel Inhibit

DATABYTE8 = Channel

Contents	Channel
1	Channel 1
...	…

8	Channel 8

Receive

0x00: Linked push button status

SID10-SID9 = 00 (highest priority)
SID8...SID1 = Address of the linked push button module
RTR = 0
DLC3...DLC0 = 4 data bytes received
DATABYTE1 = COMMAND_PUSH_BUTTON_STATUS (0x00)
DATABYTE2 = Linked push buttons just pressed (bitwise) (1 = just pressed)
DATABYTE3 = Linked push buttons just released (bitwise) (1 = just released)
DATABYTE4 = linked push buttons long pressed (bitwise) (1 = longer than 0.85s pressed)

0xAB: Power up message

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = 0x00
RTR = 0
DLC3...DLC0 = 2 data byte received
DATABYTE1 = COMMAND_POWER_UP (0xAB)
DATABYTE2 = module address

0xB5: CAN FD enable command

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = 0x00
RTR = 0
DLC3...DLC0 = 2 data byte received
DATABYTE1 = COMMAND_SET_CLR_LEARN_RF_CODE (0xB5)
DATABYTE2 = enable/disable (0 = disable CAN FD / 1 = enable CAN FD)

0xD7: Real time clock status request

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = 0x00
RTR = 0
DLC3...DLC0 = 1 data byte received
DATABYTE1 = COMMAND_REALTIME_CLOCK_STATUS_REQUEST (0xD7)

0xD7: Real time clock status request

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 1 data byte to received
DATABYTE1 = COMMAND_REALTIME_CLOCK_STATUS_REQUEST (0xD7)

0xD8: Set real time clock

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = 0x00
RTR = 0
DLC3...DLC0 = 4 data bytes received
DATABYTE1 = COMMAND_SET_REALTIME_CLOCK (0xD8)
DATABYTE2 = Day of week

Contents day of week'	Description
H'00'	Monday
H'01'	Tuesday
H'02'	Wednesday
H'03'	Thursday
H'04'	Friday
H'05'	Saterday
H'06'	Sunday

DATABYTE3 = Hours (0…23)
DATABYTE4 = Minutes (0…59)

0xB7: Set date

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = 0x00
RTR = 0
DLC3...DLC0 = 5 data bytes received
DATABYTE1 = COMMAND_SET_REALTIME_DATE (0xB7)
DATABYTE2 = Day (1…31)
DATABYTE3 = Month (1…12)
DATABYTE4 = High byte of Year
DATABYTE5 = Low byte of Year

0xAF: Set daylight savings

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = 0x00
RTR = 0
DLC3...DLC0 = 2 data bytes received
DATABYTE1 = COMMAND_SET_DAYLIGHT_SAVING (0xAF)
DATABYTE2 = 0 =disabled / 1 = enabled

0xAE: Enable/disable global sunrise/sunset related actions

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = 0x00
RTR = 0
DLC3...DLC0 = 3 data bytes received
DATABYTE1 = COMMAND_ENA_DIS_SUNRISE_SUNSET (0xAE)
DATABYTE2 = Channel (0xFF)
DATABYTE3 = enable/disable flags

Contents	Description
B'xxxxxxx0'	Disable sunrise related actions
B'xxxxxxx1'	Enable sunrise related actions
B'xxxxxx0x'	Disable sunset related actions
B'xxxxxx1x'	Enable sunset related actions

0xAE: Enable/disable local sunrise/sunset related actions

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 3 data bytes received
DATABYTE1 = COMMAND_ENA_DIS_SUNRISE_SUNSET (0xAE)
DATABYTE2 = Channel (0xFF)
DATABYTE3 = enable/disable flags

Contents	Description
B'xxxxxxx0'	Disable sunrise related actions
B'xxxxxxx1'	Enable sunrise related actions
B'xxxxxx0x'	Disable sunset related actions
B'xxxxxx1x'	Enable sunset related actions

0xC3: Set global clock alarm

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = 0x00
RTR = 0
DLC3...DLC0 = 7 data bytes received
DATABYTE1 = COMMAND_SET_ALARM_CLOCK (0xC3)
DATABYTE2 = Alarm number (1 or 2)
DATABYTE3 = Wake up hour (0…23)
DATABYTE4 = Wake up minute (0…59)
DATABYTE5 = Go to bed hour (0…23)
DATABYTE6 = Go to bed minute (0…59)
DATABYTE7 = Clock alarm enable flag (0 = disabled / 1 = enabled)

0xC3: Set local clock alarm

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 7 data bytes received
DATABYTE1 = COMMAND_SET_ALARM_CLOCK (0xC3)
DATABYTE2 = Alarm number (1 or 2)
DATABYTE3 = Wake up hour (0…23)
DATABYTE4 = Wake up minute (0…59)
DATABYTE5 = Go to bed hour (0…23)
DATABYTE6 = Go to bed minute (0…59)
DATABYTE7 = Clock alarm enable flag (0 = disabled / 1 = enabled)

(scan)Module type request

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 1
DLC3...DLC0 = 0 data bytes received

0xFA: Module status request

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 2 data bytes received
DATABYTE1 = COMMAND_MODULE_STATUS_REQUEST (0xFA)
DATABYTE2 = don't care

0xEF: Channel name request

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 2 data bytes received
DATABYTE1 = COMMAND_CHANNEL_NAME_REQUEST (0xEF)
DATABYTE2 = Channel 1…8

Remark: channel = 0xFF for all channels

0xF5 Clear channel LED

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Linked module address
RTR = 0
DLC3...DLC0 = 2 data bytes received
DATABYTE1 = COMMAND_CLEAR_LED (0xF5)
DATABYTE2 = LEDs to clear (bitwise) (a one clears the corresponding LED of channel 1 to 8)

0xFD: Read data from memory

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 3 data bytes received
DATABYTE1 = COMMAND_READ_DATA_FROM_MEMORY (0xFD)
DATABYTE2 = High memory address
DATABYTE3 = LOW memory address

Remark: address range: 0x0000 to 0x07FF

0xC9: Read data block from memory

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 3 data bytes received / 4 data bytes for CAN FD response
DATABYTE1 = COMMAND_READ_MEMORY_BLOCK (0xC9)
DATABYTE2 = High memory address
DATABYTE3 = LOW memory address
DATABYTE4 = memory block length (5…60)

Remark:
address range: 0x0000 to 0x07FC
address range: 0x0000 to (0x0800 – memory block length) for CAN FD response

0xCB: Memory dump request

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 1 data bytes received
DATABYTE1 = COMMAND_MEMORY_DUMP_REQUEST (0xCB)

0xFC: Write data to memory

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 4 data bytes received
DATABYTE1 = COMMAND_WRITE_DATA_TO_MEMORY (0xFC)
DATABYTE2 = High memory address
DATABYTE3 = LOW memory address
DATABYTE4 = memory data to write

Remark:
Wait for 'memory data' feedback before sending a next command on the velbus.
Address range: 0x0000 to 0x07FF
Read only location cannot be changed
Terminate always with a write command at the last memory location.

0xCA: Write memory block

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 7 data bytes received
DATABYTE1 = COMMAND_WRITE_MEMORY_BLOCK (0xCA)
DATABYTE2 = High memory address
DATABYTE3 = LOW memory address
DATABYTE4 = memory databyte1 to write
DATABYTE5 = memory databyte2 to write
DATABYTE6 = memory databyte3 to write
DATABYTE7 = memory databyte4 to write

Or

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Address of the module
RTR = 0
DLC3...DLC0 = number of data bytes to send

Contents	Number of data bytes
0x09	12 data bytes
0x0A	16 data bytes
0x0B	20 data bytes
0x0C	24 data bytes
0x0D	32 data bytes
0x0E	48 data bytes
0x0F	64 data bytes

DATABYTE1 = COMMAND_WRITE_MEMORY_BLOCK (0xCA)
DATABYTE2 = High memory address
DATABYTE3 = LOW memory address
DATABYTE4 = memory block length (5…60)
DATABYTE5 = memory data 1 to write
…
DATABYTE12 = memory data 8 to write (end of data for DLC3...DLC0 = 0x09)
…
DATABYTE16 = memory data 12 to write (end of data for DLC3...DLC0 = 0x0A)
…
DATABYTE20 = memory data 16 to write (end of data for DLC3...DLC0 = 0x0B)
…
DATABYTE24 = memory data 20 to write (end of data for DLC3...DLC0 = 0x0C)
…
DATABYTE32 = memory data 28 to write (end of data for DLC3...DLC0 = 0x0D)
…
DATABYTE48 = memory data 44 to write (end of data for DLC3...DLC0 = 0x0E)
…
DATABYTE64 = memory data 60 to write (end of data for DLC3...DLC0 = 0x0F)

Remark:
Wait for 'memory data block' feedback before sending a next command on the velbus.
address range: 0x0000 to 0x07FC for standard CAN response
address range: 0x0000 to (0x0800 – memory block length) for CAN FD response
Contents of unused data bytes = 0x55
Terminate always with a write command at the last memory location.

0xD9: Bus error counter status request

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 1 data byte received
DATABYTE1 = COMMAND_BUS_ERROR_COUNTER_STATUS_REQUEST (H'D9')

0x01: Switch channel off

SID10-SID9 = 00 (highest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 2 data bytes received
DATABYTE1 = COMMAND_SWITCH_RELAY_OFF (0x01)
DATABYTE2 = Channel 1…8

Remark:
Channel number = 0xFF for all channels

0x02: Switch channel on

SID10-SID9 = 00 (highest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 2 data bytes received
DATABYTE1 = COMMAND_SWITCH_RELAY_ON (0x02)
DATABYTE2 = Channel 1…8

Remark:
Channel number = 0xFF for all channels

0x03: Start channel timer

SID10-SID9 = 00 (highest priority)
SID8...SID1 = Address of the module
RTR = 0
DLC3...DLC0 = 5 data bytes received
DATABYTE1 = COMMAND_START_RELAY_TIMER (0x03)
DATABYTE2 = Channel 1…8
DATABYTE3 = high byte of time-out time
DATABYTE4 = mid byte of time-out time
DATABYTE5 = low byte of time-out time

Remark:
Channel number = 0xFF for all channels
[DATABYTE3][DATABYTE4][DATABYTE5] contains a 24-bit time-out time in seconds.
If the time-out parameter contains zero then no timer starts.
If the time-out parameter contains 0xFFFFFF then the channel switches permanently on (no time-out).

0x12: Forced off

SID10-SID9 = 00 (highest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 5 data bytes received
DATABYTE1 = COMMAND_FORCED_OFF (0x12)
DATABYTE2 = Channel 1…8
DATABYTE3 = high byte of delay time
DATABYTE4 = mid byte of delay time
DATABYTE5 = low byte of delay time

Remark:
Channel number = 0xFF for all channels
[DATABYTE3][DATABYTE4][DATABYTE5] contain a 24-bit time in seconds
The command will be skipped when the time parameter contains zero.
When the time parameter contains 0xFFFFFF then the dimmer is permanently forced off.

0x13: Cancel forced off

SID10-SID9 = 00 (highest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 2 data bytes received
DATABYTE1 = COMMAND_CANCEL_FORCED_OFF (0x13)
DATABYTE2 = Channel 1…8

Remark:
Channel number = 0xFF for all channels

0x14 Forced on

SID10-SID9 = 00 (highest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 5 data bytes received
DATABYTE1 = COMMAND_FORCED_ON (0x14)
DATABYTE2 = Channel 1…8
DATABYTE3 = high byte of delay time
DATABYTE4 = mid byte of delay time
DATABYTE5 = low byte of delay time

Remark:
Channel number = 0xFF for all channels
[DATABYTE3][DATABYTE4][DATABYTE5] contain a 24-bit time in seconds
The command will be skipped when the time parameter contains zero or the channels are already forced off.
When the time parameter contains 0xFFFFFF then the dimmer is permanently forced on.

0x15: Cancel forced on

SID10-SID9 = 00 (highest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 2 data bytes received
DATABYTE1 = COMMAND_CANCEL_FORCED_ON (0x15)
DATABYTE2 = Channel 1…8

Remark:
Channel number = 0xFF for all channels

0x16: Inhibit

SID10-SID9 = 00 (highest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 5 data bytes received
DATABYTE1 = COMMAND_INHIBIT (0x16)
DATABYTE2 = Channel 1…8
DATABYTE3 = high byte of delay time
DATABYTE4 = mid byte of delay time
DATABYTE5 = low byte of delay time

Remark:
Channel number = 0xFF for all channels
[DATABYTE3][DATABYTE4][DATABYTE5] contain a 24-bit time in seconds
The command will be skipped when the time parameter contains zero or the channels are already forced off/on.
When the time parameter contains 0xFFFFFF then the dimmer is permanently inhibited.

0x17: Cancel inhibit

SID10-SID9 = 00 (highest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 2 data bytes received
DATABYTE1 = COMMAND_CANCEL_INHIBIT (0x17)
DATABYTE2 = Channel 1…8

Remark:
Channel number = 0xFF for all channels

0xB2: Enable Channel Program

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 2 data bytes received
DATABYTE1 = COMMAND_ENABLE_PROGRAM (0xB2)
DATABYTE2 = Channel 1…8

Remark: channel number = 0xFF for all channels

0xB1: Disable Channel Program

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 5 data bytes received
DATABYTE1 = COMMAND_DISABLE_PROGRAM (0xB1)
DATABYTE2 = Channel 1…8
DATABYTE3 = high byte of delay time
DATABYTE4 = mid byte of delay time
DATABYTE5 = low byte of delay time

Remark:
Channel number = 0xFF for all channels
[DATABYTE3][DATABYTE4][DATABYTE5] contain a 24-bit time in seconds
The command will be skipped when the time parameter contains zero.
When the time parameter contains 0xFFFFFF then the channel program will be permanently disabled.

0xB3: Select Program

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 2 data bytes received
DATABYTE1 = COMMAND_SELECT_PROGRAM (0xB3)
DATABYTE2 = Program mode

Contents	Selected program
0	None
1	Program group 1 (Summer)
2	Program group 2 (Winter)
3	Program group 3 (Holiday)

0xC0: Read program step

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 5 data bytes received
DATABYTE1 = COMMAND_READ_PROGRAM_STEP (0xC0)
DATABYTE2 = Start program step number (1…122)
DATABYTE3 = Program group number (1…3)
DATABYTE2 = Channel 1…8
DATABYTE5 = Search direction (1 = search for next matched step / 0 = search for previous matched program step)

0xC2: Write program step

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 8 data bytes received
DATABYTE1 = COMMAND_WRITE_PROGRAM_STEP (0xC2)
DATABYTE2 = Program step number (1…122)
DATABYTE3 = Program reference

Contents	Description
000xxxxx	Disable program step
001xxxxx	Absolute time
010xxxxx	Wake up time 1 + relative time
011xxxxx	Go to bed time 1 + relative time
100xxxxx	Wake up time 2 + relative time
101xxxxx	Go to bed time 2 + relative time
110xxxxx	Sunrise + relative time
111xxxxx	Sunset + relative time
xxx01111	Rel. time = 3h45min
…	
xxx00001	Rel. time = 15min
xxx00000	Rel. time = 0
xxx11111	Rel. time = -15min
…	
xxx10000	Rel. time = -4h

DATABYTE4 = Program step month & four least significant bits of day

Contents	Description
xxxx0000	Weekly program
xxxx0001	January
xxxx0010	February
xxxx0011	March
xxxx0100	April
xxxx0101	May
xxxx0110	June
xxxx0111	July
xxxx1000	August
xxxx1001	September
xxxx1010	October
xxxx1011	November
xxxx1100	December
xxxx1101	Monthly program
xxxx1110	Monthly program
xxxx1111	Monthly program

Contents byte6	Contents byte4	Description
00xxxxxx	0000xxxx	Never
00xxxxxx	0001xxxx	Day 1of the month
00xxxxxx	0010xxxx	Day 2of the month
…	...	…
01xxxxxx	1111xxxx	Day 31of the month

10xxxxxx	0000xxxx	Never
10xxxxxx	0001xxxx	Every Monday
10xxxxxx	0010xxxx	Every Tuesday
...	…	…
10xxxxxx	0111xxxx	Every Sunday
10xxxxxx	1000xxxx	Every weekend (sa & su)
10xxxxxx	1001xxxx	Every working day (mo…fr)
10xxxxxx	1010xxxx	Every day except Sunday
10xxxxxx	1011xxxx	Every day
10xxxxxx	1100xxxx	Never
…	…	…
11xxxxxx	1111xxxx	Never

DATABYTE5 = Program step hour & group number

Contents	Description
xxx00000	0h
xxx00001	1h
…	…
xxx10111	23h
xx1xxxxx	Program group 1 (Summer program)
x1xxxxxx	Program group 2 (Winter program)
1xxxxxxx	Program group 3 (Holiday program)

DATABYTE6 = Program step minute & msb of day & every flag

Contents	Description
xx000000	0min
xx000001	1min
…	…
xx111011	59min

Contents byte6	Contents byte4	Description
00xxxxxx	0000xxxx	Never
00xxxxxx	0001xxxx	Day 1of the month
00xxxxxx	0010xxxx	Day 2of the month
…	...	…
01xxxxxx	1111xxxx	Day 31of the month
10xxxxxx	0000xxxx	Never
10xxxxxx	0001xxxx	Every Monday
10xxxxxx	0010xxxx	Every Tuesday
...	…	…
10xxxxxx	0111xxxx	Every Sunday
10xxxxxx	1000xxxx	Every weekend (sa & su)
10xxxxxx	1001xxxx	Every working day (mo…fr)
10xxxxxx	1010xxxx	Every day except Sunday
10xxxxxx	1011xxxx	Every day
10xxxxxx	1100xxxx	Never
…	…	…
11xxxxxx	1111xxxx	Never

DATABYTE7 = Program step action

Contents	Action
248	On
249	Off
250	Forced Off
251	Cancel Forced Off
252	Forced On
253	Cancel Forced On
254	Inhibit
255	Cancel Inhibit

DATABYTE8 = Channel

Contents	Channel
1	Channel 1
...	…
8	Channel 8

Remark:
Erase program step if channel parameter is equal with zero.

0x6A: Change master address and serial number

SID10-SID9 = 01 (firmware priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 7 data bytes received
DATABYTE1 = COMMAND_WRITE_ADDR_SERIALNR (0x6A)
DATABYTE2 = Module type (0x0D = VMB1RYS-20 / 0x26 = VMB4RYLD-20 / 0x27 = VMB4RYNO-20)
DATABYTE3 = Current serial nr high byte
DATABYTE4 = Current serial nr low byte
DATABYTE5 = New module address
DATABYTE6 = New serial nr high byte
DATABYTE7 = New serial nr low byte

Response:
Module Type

Memory map

version 1

Address	Contents
0x0000	Channel 1 name character 1
...	...
0x000F	Channel 1 name character 16
0x0010	NO/NC mode
0x0011	Not used
0x0012	Not used
0x0013	Not used
...	...
0x008C	Channel 8 name character 1
...	...
0x009B	Channel 8 name character 16
0x009C	NO/NC mode
0x009D	Not used
0x009E	Not used
0x009F	Not used
0x00A0	Not used
0x00A1	Not used
0x00A2	Not used
0x00A3	Alarm clock configuration
0x00A4	Wake up 1 hour (0…23)
0x00A5	Wake up 1 minutes (0…59)
0x00A6	Go to bed 1 hour (0…23)
0x00A7	Go to bed 1 minutes (0…59)
0x00A8	Wake up 2 hour (0…23)
0x00A9	Wake up 2 minutes (0…59)
0x00AA	Go to bed 2 hour (0…23)
0x00AB	Go to bed 2 minutes (0…59)
0x00AC	Sunrise hour at 21 December (0…23)
0x00AD	Sunrise minutes at 21 December (0…59)
0x00AE	Sunrise 21 January – sunrise 5 January (-128'...127')
0x00AF	Sunrise 5 February – sunrise 21 January (-128'...127')
0x00B0	Sunrise 21 February – sunrise 5 February (-128'...127')
0x00B1	Sunrise 5 March – sunrise 21 February (-128'...127')
0x00B2	Sunrise 21 March – sunrise 5 March (-128'…127')
0x00B3	Sunrise 5 April – sunrise 21 March (-128'...127')
0x00B4	Sunrise 21 April – sunrise 5 April (-128'…127')
0x00B5	Sunrise 5 May – sunrise 21 April (-128'...127')
0x00B6	Sunrise 21 May – sunrise 5 May (-128'…127')
0x00B7	Sunrise 5 June – sunrise 21 May (-128'...127')
0x00B8	Sunrise 21 June – sunrise 5 June (-128'…127')
0x00B9	Sunrise 5 July – sunrise 21 June (-128'...127')
0x00BA	Sunrise 21 July – sunrise 5 July (-128'…127')
0x00BB	Sunrise 5 August – sunrise 21 July (-128'...127')
0x00BC	Sunrise 21 August – sunrise 5 August (-128'...127')
0x00BD	Sunrise 5 September – sunrise 21 August (-128'…127')
0x00BE	Sunrise 21 September – sunrise 5 September (-128...127')
0x00BF	Sunrise 5 October – sunrise 21 Sept. (-128'...127')
0x00C0	Sunrise 21 October – sunrise 5 October (-128'…127')
0x00C1	Sunrise 5 November – sunrise 21 Oct. (-128'...127')
0x00C2	Sunrise 21 November – sunrise 5 November (-128'...127')
0x00C3	Sunrise 5 December – sunrise 21 Nov. (-128'...127')
0x00C4	Sunrise 21 December – sunrise 5 December (-128'...127')
0x00C5	Sunrise 5 January – sunrise 21 December (-128'...127')
0x00C6	Not used
0x00C7	Not used
0x00C8	Sunset hour at 21 December (0…23)
0x00C9	Sunset minutes at 21 December (0…59)
0x00CA	Sunset 21 January – sunset 5 January (-128'...127')
0x00CB	Sunset 5 February – sunset 21 January (-128'...127')

0x00CC	Sunset 21 February – sunset 5 February (-128'...127')
0x00CD	Sunset 5 March – sunset 21 February (-128'...127')
0x00CE	Sunset 21 March – sunset 5 March (-128'...127')
0x00CF	Sunset 5 April – sunset 21 March (-128'...127')
0x00D0	Sunset 21 April – sunset 5 April (-128'...127')
0x00D1	Sunset 5 May – sunset 21 April (-128'...127')
0x00D2	Sunset 21 May – sunset 5 May (-128'...127')
0x00D3	Sunset 5 June – sunset 21 May (-128'...127')
0x00D4	Sunset 21 June – sunset 5 June (-128'...127')
0x00D5	Sunset 5 July – sunset 21 June (-128'...127')
0x00D6	Sunset 21 July – sunset 5 July (-128'...127')
0x00D7	Sunset 5 August – sunset 21 July (-128'...127')
0x00D8	Sunset 21 August – sunset 5 August (-128'...127')
0x00D9	Sunset 5 September – sunset 21 August (-128'...127')
0x00DA	Sunset 21 September – sunset 5 September (-128'...127')
0x00DB	Sunset 5 October – sunset 21 September (-128'...127')
0x00DC	Sunset 21 October – sunset 5 October (-128'...127')
0x00DD	Sunset 5 November - sunset 21 October (-128'...127')
0x00DE	Sunset 21 November – sunset 5 November (-128'...127')
0x00DF	Sunset 5 December - sunset 21 Nov. (-128'...127')
0x00E0	Sunset 21 December – sunset 5 December (-128'...127')
0x00E1	Sunset 5 January – sunset 21 December (-128'...127')
0x00E2	Not used
0x00E3	Not used

Remark:
Unused locations contain H'FF'

NO/NC configuration

Contents	NO/NC
B'xxxxxxx1'	Channel normal open (default)
B'xxxxxxx0'	Channel normal closed

Virtual channels are fixed normal open

Alarm clock configuration

Contents	Channel locked/unlocked
B'xxxxxxx0'	Alarm 1 disabled (default)
B'xxxxxxx1'	Alarm 1 enabled
B'0xxxxx0x'	Local alarm 1 (default)
B'1xxxxx1x'	Global alarm 1
B'xxxxx0xx'	Alarm 2 disabled (default)
B'xxxxx1xx'	Alarm 2 enabled
B'xxxx0xxx'	Local alarm 2 (default)
B'xxxx1xxx'	Global alarm 2
B'xxx0xxxx'	Sunrise disabled
B'xxx1xxxx'	Sunrise enabled (default)
B'xx0xxxxx'	Sunset disabled
B'xx1xxxxx'	Sunset enabled (default)
B'x0xxxxxx'	Day light savings disabled
B'x1xxxxxx'	Day light savings enabled (default)

Address	Contents
0x00E4	Links in use byte 0 (LSB)
0x00E5	Links in use high byte1
0x00E6	Links in use low byte 2
0x00E7	Links in use low byte 3 (MSB)
0x00E8	Linked Push button 1 module address
0x00E9	Linked Push button 1 bit number
0x00EA	Linked Push button 1 action
0x00EB	Linked Push button 1 parameter 1
0x00EC	Linked Push button 1 parameter 2
0x00ED	Linked Push button 1 parameter 3
0x00EE	Linked Push button 1 parameter 4
...	...
0x04D1	Linked Push button 144 module address
0x04D2	Linked Push button 144 bit number
0x04D3	Linked Push button 144 action
0x04D4	Linked Push button 144 parameter 1
0x04D5	Linked Push button 144 parameter 2
0x04D6	Linked Push button 144 parameter 3
0x04D7	Linked Push button 144 parameter 4

Remark: Unused locations contain 0xFF

Action

Action Byte	Action
B'0xxxxxxx'	Execute action at button pressed or during closed switch
B'1xxxxxxx'	Execute action at button released or during open switch
B'x0000000'	Action number 0
…	…
B'x1111111'	Action number 127

Action number	Action	Parameter 1	Parameter 2	Parameter 3	Parameter 4
0	Momentary	-	-	-	Channel
1	Off	-	-	-	Channel
2	Off with timers disabled	-	-	-	Channel
3	Off with timers disabled at short press	-	-	-	Channel
4	Off with timers disabled at long press	-	-	-	Channel
5	On	-	-	-	Channel
6	On with timers disabled	-	-	-	Channel
7	On with timers disabled at short press	-	-	-	Channel
8	On with timers disabled at long press	-	-	-	Channel
9	Toggle	-	-	-	Channel
10	Toggle' with timers disabled	-	-	-	Channel
11	Toggle with timers disabled at short press	-	-	-	Channel
12	Toggle with timers disabled at long press	-	-	-	Channel
13	Start/stop timer	Time-out at short press or at release	Time-out at long press (not applicable at release)	-	Channel
14	Restartable timer	Time-out at short press or at release	Time-out at long press (not applicable at release)	-	Channel
15	Non-retriggerable timer	Time-out	-	-	Channel
16	Trigger on release timer	Time-out	-	-	Channel
17	Delayed on during closed/open switch with delayed off	-	Delay-off time	Delay-on time	Channel
18	Delayed off only when relay is on	-	Delay-off time	-	Channel
19	Start/stop delayed On	Time-out	-	Delay-on time	Channel
20	Restartable delayed On	Time-out	-	Delay-on time	Channel
21	Non restartable delayed On	Time-out	-	Delay-on time	Channel
22	Start/Stop interval timer	Time-out	Pulse time	Pause time	Channel
23	Restartable interval timer	Time-out	Pulse time	Pause time	Channel
24	Non restartable interval timer	Time-out	Pulse time	Pause time	Channel
25	Interval during closed/open switch	-	Pulse time	Pause time	Channel
26	Short pulse (0.5 sec)	-	-	-	Channel
27	Short pulse interval (0.5 s) during closed/open switch	-	-	-	Channel
28	Start/Stop Short pulse interval (0.5 sec) timer	Time-out	-	-	Channel

29	Restartable Short pulse interval (0.5 sec) timer	Time-out	-	-	Channel
30	Non restartable Short pulse interval (0.5 sec) timer	Time-out	-	-	Channel
31	Forced Off during closed/open switch	-	-	-	Channel
32	Forced Off	Time-out	-	-	Channel
33	Toggle forced Off	Time-out	-	-	Channel
34	Cancel forced Of	-	-	-	Channel
35	Forced On during closed/open switch	-	-	-	Channel
36	Forced On	Time-out	-	-	Channel
37	Toggle forced On	Time-out	-	-	Channel
38	Cancel Forced On	-	-	-	Channel
39	Inhibit during closed/open switch	-	-	-	Channel
40	Inhibit	Time-out	-	-	Channel
41	Toggle inhibit	Time-out	-	-	Channel
42	Cancel inhibit	-	-	-	Channel
43	Logical OR	-	-	-	Channel
44	Logical NOR	-	-	-	Channel
45	Logical AND	-	-	-	Channel
46	Logical NAND	-	-	-	Channel
47	Logical XOR	-	-	-	Channel
48	Logical XNOR	-	-	-	Channel
49	Disable channel program at closed/open switch	-	-		Channel
50	Disable channel program	Time-out	-		Channel
51	Disable/enable channel program	Time-out	-		Channel
52	Enable channel program	-	-		Channel
53	Select no programs	-	-	-	-
54	Select program group 1	-	-	-	-
55	Toggle program group 1	-	-	-	-
56	Select program group 2	-	-	-	-
57	Toggle program group 2	-	-	-	-
58	Select program group 3	-	-	-	-
59	Toggle program group 3	-	-	-	-
60	Enable Alarm 1 at closed/open switch	-	-		-
61	Disable Alarm 1 at closed/open switch	-	-		-
62	Enable Alarm 1	-	-		-
63	Enable/Disable Alarm 1	-	-		-
64	Disable Alarm 1	-	-		-
65	Enable Alarm 2 at closed/open switch	-	-		-
66	Disable Alarm 2 at closed/open switch	-	-		-
67	Enable Alarm 2	-	-		-
68	Enable/Disable Alarm 2	-	-		-
69	Disable Alarm 2	-	-		-
70	Enable Sunrise at closed/open switch	-	-		-
71	Disable Sunrise at closed/open switch	-	-		-
72	Enable Sunrise	-	-		-
73	Enable/Disable Sunrise	-	-		-
74	Disable Sunrise	-	-		-
75	Enable Sunset at closed/open switch	-	-		-
76	Disable Sunset at closed/open switch	-	-		-
77	Enable Sunset	-	-		-
78	Enable/Disable Sunset	-	-		-
79	Disable Sunset	-	-	-	-

Parameter 1: delay, pulse, pause & time-out

Parameter 1, 2 , 3	Delay/Time-out/Pulse time/Pause time
0	0s (no timer)
1	1s
2	2s
3	3s
...	
119	1min59s
120	2min
121	2min15s
...	
131	4min45s
132	5min
133	5min30s
...	

181	29min30s
182	30min
183	31min
...	
211	59min
212	1h
213	1h15min
...	
227	4h45min
228	5h
229	5h30min
...	...
237	9h30min
238	10h
239	11h
...	
251	23h
252	1d
253	2d
254	3d
255	Infinite

Parameter 4: channel number

Parameter 4	Channel
1	Channel 1
2	Channel 2
3	Channel 3
...	…
8	Channel 8

Program Steps

Address	Contents
0x04D8	Program steps used byte 0 (LSB)
0x04D9	Program steps used byte 1
0x04DA	Program steps used byte 2
0x04DB	Program steps used byte 3 (MSB)
0x04DC	Program step 1 byte1
0x04DD	Program step 1 byte2
0x04DE	Program step 1 byte3
0x04DF	Program step 1 byte4
0x04E0	Program step 1 byte5
0x04E1	Program step 1 byte6
…	..
0x07B2	Program step 122 byte1
0x07B3	Program step 122 byte2
0x07B4	Program step 122 byte3
0x07B5	Program step 122 byte4
0x07B6	Program step 122 byte5
0x07B7	Program step 122 byte6

Contents program byte1	Description
B'000xxxxx'	Disable program step
B'001xxxxx'	Absolute time
B'010xxxxx'	Wake up time 1 + relative time
B'011xxxxx'	Go to bed time 1 + relative time
B'100xxxxx'	Wake up time 2 + relative time
B'101xxxxx'	Go to bed time 2 + relative time
B'110xxxxx'	Sunrise + relative time
B'111xxxxx'	Sunset + relative time
B'xxx01111'	Rel. time = 3h45min
…	
B'xxx00001'	Rel. time = 15min
B'xxx00000'	Rel. time = 0
B'xxx11111'	Rel. time = -15min
…	
B'xxx10000'	Rel. time = -4h

Remark: Wake up, Go to bed, sunrise & sunset time are only allowed for weekly programs

Contents program byte2	Description
B'xxxx0000'	Weekly program
B'xxxx0001'	January
B'xxxx0010'	February
B'xxxx0011'	March
B'xxxx0100'	April
B'xxxx0101'	May
B'xxxx0110'	June
B'xxxx0111'	July
B'xxxx1000'	August
B'xxxx1001'	September
B'xxxx1010'	October
B'xxxx1011'	November
B'xxxx1100'	December
B'xxxx1101'	Monthly program
B'xxxx1110'	Monthly program
B'xxxx1111'	Monthly program

Contents program byte3	Description
B'xxx00000'	0h
B'xxx00001'	1h
…	…
B'xxx10111'	23h

B'xx1xxxxx'	Program group 1 (Summer program)
B'x1xxxxxx'	Program group 2 (Winter program)
B'1xxxxxxx'	Program group 3 (Holiday program)

Contents program byte4	*Description*
B'xx000000'	0min
B'xx000001'	1min
…	…
B'xx111011'	59min

Contents program byte4	Contents program byte2	Description
B'00xxxxxx'	B'0000xxxx'	Never
B'00xxxxxx'	B'0001xxxx'	Day 1of the month
B'00xxxxxx'	B'0010xxxx'	Day 2of the month
…	…	…
B'01xxxxxx'	B'1111xxxx'	Day 31of the month
B'10xxxxxx'	B'0000xxxx'	Never
B'10xxxxxx'	B'0001xxxx'	Every Monday
B'10xxxxxx'	B'0010xxxx'	Every Tuesday
…	…	…
B'10xxxxxx'	B'0111xxxx'	Every Sunday
B'10xxxxxx'	B'1000xxxx'	Every weekend (sa & su)
B'10xxxxxx'	B'1001xxxx'	Every working day (mo…fr)
B'10xxxxxx'	B'1010xxxx'	Every day except Sunday
B'10xxxxxx'	B'1011xxxx'	Every day
B'10xxxxxx'	B'1100xxxx'	Never
…	…	…
B'11xxxxxx'	B'1111xxxx'	Never

Contents program byte5	Action
248	On
249	Off
250	Forced Off
251	Cancel Forced Off
252	Forced On
253	Cancel Forced On
254	Inhibit
255	Cancel Inhibit

Contents program byte6	Channel
0	Program step = empty
1	Channel 1
...	…
8	Channel 8
255	Program step = empty

Miscellaneous

Address	Contents
0x07B8	Location id low byte
0x07B9	Location id high byte
0x07BA	Group id low byte
0x07BB	Group id high byte
0x07BC	Module name character 1
0x07BD	Module name character 2
…	…
0x07FA	Module name character 63
0x07FB	Module name character 64
0x07FC	Not used
0x07FD	Not used
0x07FE	Not used
0x07FF	Used for flash writing

Remark:
Unused locations contain H'FF'

Scenarios

When the module starts or reboot

The module will transmit the following packets:
Powerup
Clock Request
Channel Status -> Indicating that all channels are released
Module Status

Receive Scan packet

The module must respond with the ModuleType Packet

User Presses a button

A button press will toggle the corresponding relay channel.
The channel will respond with a Module Status packet and a Chanel Status packet appropriately.
Depending on how the channel is locked. For example inhibited or locked or forced.
If an action is linked to the corresponding action a led feedback message will be transmitted if needed.
This could be:
Clear LED
Set LED
Blink LED slow
Blink LED fast
Blink LED very fast

Receive Memory Dump request

If the module receives a memory dump request. The module will not respond with the completely with the full memory map. It will only transmit the necessary data. For example, if there are not program steps activated the module will send the number of active program steps and will skip to the next useful address, which is location ID. The same can happen with action. This is to shorten the time that the device is active on the bus.

Receive a powerup message

The module should sync the blinking led (reset the blink timer)