

# **VMB2BLE-20**

**2 channel blind module for VELBUS  
system**

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## Packet Format

### Binary format:

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

<i>bits</i>	<i>Description</i>
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 = VMB2BLE-20 type (0x61)

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

<i>Contents</i>	<i>Number of data bytes</i>
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 or 2

DATABYTE3 = Character 1 of the blind name

DATABYTE4 = Character 2 of the blind name

DATABYTE5 = Character 3 of the blind name

DATABYTE6 = Character 4 of the blind name

DATABYTE7 = Character 5 of the blind name

DATABYTE8 = Character 6 of the blind 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 or 2

DATABYTE3 = Character 7 of the blind name

DATABYTE4 = Character 8 of the blind name

DATABYTE5 = Character 9 of the blind name

DATABYTE6 = Character 10 of the blind name

DATABYTE7 = Character 11 of the blind name

DATABYTE8 = Character 12 of the blind 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 or 2

DATABYTE3 = Character 13 of the blind name

DATABYTE4 = Character 14 of the blind name

DATABYTE5 = Character 15 of the blind name

DATABYTE6 = Character 16 of the blind name

#### Remarks:

Unused characters contain H'FF'.

### 0xEC: module status

SID10-SID9 = 11 (lowest priority)

SID8...SID1 = Module address

RTR = 0

DLC3...DLC0 = 8 data bytes to send

DATABYTE1 = COMMAND\_BLIND\_STATUS (0xEC)

DATABYTE2 = Blind status

Contents	Blind status
B'xxxx0000'	Channel 1 blind off
B'xxxx0001'	Channel 1 blind up
B'xxxx0010'	Channel 1 blind down
B'0000xxxx'	Channel 2 blind off
B'0001xxxx'	Channel 2 blind up
B'0010xxxx'	Channel 2 blind down

DATABYTE3 = Channel 1 blind position (0% = up...100%=down)

DATABYTE4 = Channel 2 blind position (0% = up...100%=down)

DATABYTE5 = Locked/inhibit/Forced up/ Forced down on setting

Contents	Setting
B'xxxx0000'	Channel 1 blind normal
B'xxxx0001'	Channel 1 blind inhibited
B'xxxx0010'	Channel 1 blind inhibit preset down
B'xxxx0011'	Channel 1 blind inhibit preset up
B'xxxx0100'	Channel 1 blind forced down
B'xxxx0101'	Channel 1 blind forced up
B'xxxx0110'	Channel 1 blind locked
B'0000xxxx'	Channel 2 blind normal
B'0001xxxx'	Channel 2 blind inhibited
B'0010xxxx'	Channel 2 blind inhibit preset down
B'0011xxxx'	Channel 2 blind inhibit preset up
B'0100xxxx'	Channel 2 blind forced down
B'0101xxxx'	Channel 2 blind forced up
B'0110xxxx'	Channel 2 blind locked

DATABYTE6 = mode selection

Contents	Selected program
B'xxxx0000'	Channel 1 mode disabled
B'xxxx0001'	Channel 1 mode 1
B'xxxx0010'	Channel 1 mode 2
B'xxxx0011'	Channel 1 mode 3
B'0000xxxx'	Channel 2 mode disabled
B'0001xxxx'	Channel 2 mode 1
B'0010xxxx'	Channel 2 mode 2
B'0011xxxx'	Channel 2 mode 3

DATABYTE7 = channel program disable/enable

Contents	Selected program
B'xxxx0000'	Channel 1 programs enabled
B'xxxx0001'	Channel 1 programs disabled
B'0000xxxx'	Channel 2 programs enabled
B'0001xxxx'	Channel 2 programs disabled

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)

### 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...168 / 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 1 of the month
00xxxxxx	0010xxxx	Day 2 of the month
...	...	...
01xxxxxx	1111xxxx	Day 3 of 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 1 of the month
00xxxxxx	0010xxxx	Day 2 of the month
...	...	...
01xxxxxx	1111xxxx	Day 31 of 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
0	Down
1	Up
2	Locked
3	Cancel locked
4	Forced down
5	Cancel forced down
6	Forced up
7	Cancel forced up
8	Inhibit
9	Inhibit preset down
10	Inhibit preset up
11	Cancel Inhibit
12	Deselect mode
13	Select mode 1
14	Select mode 2
15	Select mode 3

DATABYTE8 = Channel

Contents	Channel
1	Channel 1
2	Channel 2



## 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'	Saturday
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

<i>Contents</i>	<i>Description</i>
B'xxxxxxxx0'	Disable sunrise related actions
B'xxxxxxxx1'	Enable sunrise related actions
B'xxxxxxxx0x'	Disable sunset related actions
B'xxxxxxxx1x'	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

<i>Contents</i>	<i>Description</i>
B'xxxxxxxx0'	Disable sunrise related actions
B'xxxxxxxx1'	Enable sunrise related actions
B'xxxxxxxx0x'	Disable sunset related actions
B'xxxxxxxx1x'	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, 2 or 255 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

<i>Contents</i>	<i>Number of data bytes</i>
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')

#### 0x04: Switch blind off

SID10-SID9 = 00 (highest priority)  
SID8...SID1 = Module address  
RTR = 0  
DLC3...DLC0 = 2 data bytes received  
DATABYTE1 = COMMAND\_SWITCH\_BLIND\_OFF (0x04)  
DATABYTE2 = Channel 1, 2 or 255 for all channels

#### 0x05: Switch Blind up

SID10-SID9 = 00 (highest priority)  
SID8...SID1 = Module address  
RTR = 0  
DLC3...DLC0 = 5 data bytes received  
DATABYTE1 = COMMAND\_BLIND\_UP (0x05)  
DATABYTE2 = Channel 1, 2 or 255 for all channels  
DATABYTE3 = high byte of time out  
DATABYTE4 = mid byte of time out  
DATABYTE5 = low byte of time out

##### Remark:

[DATABYTE3][DATABYTE4][DATABYTE5] contain a 24-bit time out in seconds  
If the time parameter contains zero then the default time out is selected.  
The time parameter 0xFFFFFFFF is not allowed.

#### 0x06: Switch Blind down

SID10-SID9 = 00 (highest priority)  
SID8...SID1 = Module address  
RTR = 0  
DLC3...DLC0 = 5 data bytes received  
DATABYTE1 = COMMAND\_BLIND\_DOWN (0x06)  
DATABYTE2 = Channel 1, 2 or 255 for all channels  
DATABYTE3 = high byte of time out  
DATABYTE4 = mid byte of time out  
DATABYTE5 = low byte of time out

##### Remark:

[DATABYTE3][DATABYTE4][DATABYTE5] contain a 24-bit time out in seconds  
If the time parameter contains zero then the default time out is selected.  
The time parameter 0xFFFFFFFF is not allowed.

#### 0x1C: Set blind position

SID10-SID9 = 00 (highest priority)  
SID8...SID1 = Address of the module  
RTR = 0  
DLC3...DLC0 = 3 data bytes received  
DATABYTE1 = COMMAND\_BLIND\_POS (0x1C)  
DATABYTE2 = Channel 1, 2 or 255 for all channels  
DATABYTE3 = blind position (0...100%)

### 0x1A: Lock

SID10-SID9 = 00 (highest priority)  
SID8...SID1 = Module address  
RTR = 0  
DLC3...DLC0 = 5 data bytes received  
DATABYTE1 = COMMAND\_LOCK (0x1A)  
DATABYTE2 = Channel 1, 2 or 255 for all channels  
DATABYTE3 = high byte of delay time  
DATABYTE4 = mid byte of delay time  
DATABYTE5 = low byte of delay time

#### Remark:

[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 0xFFFFFFFF then the dimmer is permanently locked.

### 0x1B: Cancel lock

SID10-SID9 = 00 (highest priority)  
SID8...SID1 = Module address  
RTR = 0  
DLC3...DLC0 = 2 data bytes received  
DATABYTE1 = COMMAND\_UNLOCK (0x1B)  
DATABYTE2 = Channel 1, 2 or 255 for all channels

### 0x12 Forced up

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, 2 or 255 for all channels  
DATABYTE3 = high byte of delay time  
DATABYTE4 = mid byte of delay time  
DATABYTE5 = low byte of delay time

#### Remark:

[DATABYTE3][DATABYTE4][DATABYTE5] contain a 24-bit time in seconds  
The command will be skipped when the time parameter contains zero or the channel is already locked.  
When the time parameter contains 0xFFFFFFFF then the channel is permanently forced up.

### 0x13: Cancel forced up

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, 2 or 255 for all channels

#### 0x14 Forced down

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, 2 or 255 for all channels  
DATABYTE3 = high byte of delay time  
DATABYTE4 = mid byte of delay time  
DATABYTE5 = low byte of delay time

##### Remark:

[DATABYTE3][DATABYTE4][DATABYTE5] contain a 24-bit time in seconds

The command will be skipped when the time parameter contains zero or the channel is already locked or forced up.

When the time parameter contains 0xFFFFFFFF then the channel is permanently forced down.

#### 0x15: Cancel forced down

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, 2 or 255 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, 2 or 255 for all channels  
DATABYTE3 = high byte of delay time  
DATABYTE4 = mid byte of delay time  
DATABYTE5 = low byte of delay time

##### Remark:

[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 locked, forced up or forced down.

When the time parameter contains 0xFFFFFFFF then the channel is permanently inhibited.

#### 0x18: Inhibit preset up

SID10-SID9 = 00 (highest priority)  
SID8...SID1 = Module address  
RTR = 0  
DLC3...DLC0 = 5 data bytes received  
DATABYTE1 = COMMAND\_INHIBIT\_PRESET\_UP (0x18)  
DATABYTE2 = Channel 1, 2 or 255 for all channels  
DATABYTE3 = high byte of delay time  
DATABYTE4 = mid byte of delay time  
DATABYTE5 = low byte of delay time

##### Remark:

[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 locked, forced up, forced down or inhibited.

When the time parameter contains 0xFFFFFFFF then the channel is permanently inhibited with preset up.

### 0x19: Inhibit preset down

SID10-SID9 = 00 (highest priority)  
SID8...SID1 = Module address  
RTR = 0  
DLC3...DLC0 = 5 data bytes received  
DATABYTE1 = COMMAND\_INHIBIT\_PRESET\_DOWN (0x19)  
DATABYTE2 = Channel 1, 2 or 255 for all channels  
DATABYTE3 = high byte of delay time  
DATABYTE4 = mid byte of delay time  
DATABYTE5 = low byte of delay time

#### Remark:

[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 locked, forced up, forced down, inhibited or inhibited with preset up.

When the time parameter contains 0xFFFFFFFF then the channel is permanently inhibited with preset down.

### 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, 2 or 255 for all channels

### 0xB3: Select Auto Mode

SID10-SID9 = 11 (lowest priority)  
SID8...SID1 = Module address  
RTR = 0  
DLC3...DLC0 = 3 data bytes received  
DATABYTE1 = COMMAND\_SELECT\_PROGRAM (0xB3)  
DATABYTE2 = Channel 1, 2 or 255 for all channels  
DATABYTE3 = Auto mode

	Contents	Selected auto mode
	0	Modes disabled
	1	Mode 1
	2	Mode 2
	3	Mode 3

### 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, 2 or 255 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, 2 or 255 for all channels  
DATABYTE3 = high byte of delay time  
DATABYTE4 = mid byte of delay time  
DATABYTE5 = low byte of delay time

#### Remark:

[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 0xFFFFFFFF 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...168)

DATABYTE3 = Program group number (1...3)

DATABYTE4 = Channel 1 or 2

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...168)

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 1 of the month
00xxxxxx	0010xxxx	Day 2 of the month
...	...	...
01xxxxxx	1111xxxx	Day 31 of 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 1 of the month
00xxxxxx	0010xxxx	Day 2 of the month
...	...	...
01xxxxxx	1111xxxx	Day 31 of 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
0	Down
1	Up
2	Locked
3	Cancel locked
4	Forced down
5	Cancel forced down
6	Forced up
7	Cancel forced up
8	Inhibit
9	Inhibit preset down
10	Inhibit preset up
11	Cancel Inhibit
12	Deselect mode
13	Select mode 1
14	Select mode 2
15	Select mode 3

DATABYTE8 = Channel

Contents	Channel
1	Channel 1
2	Channel 2

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 (0x61 = VMB2BLE-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	Blind 1 name character 1
...	...
0x000F	Blind 1 name character 16
0x0010	Blind 1 time out
0x0011	Blind 1 unwind delay (s)
0x0012	Blind 1 collapse delay (s)
0x0013	Blind 1 slats rotate time
0x0014	Blind 1 location id low byte
0x0015	Blind 1 location id highbyte
0x0016	Blind 1 group id low byte
0x0017	Blind 1 group id high byte
0x0018	Blind 1 circuit id low byte
0x0019	Blind 1 circuit id high byte
0x001A	Blind 1 load id low byte
0x001B	Blind 1 load id high byte
0x001C	Blind 2 name character 1
...	...
0x002B	Blind 2 name character 16
0x002C	Blind 2 time out
0x002D	Blind 2 unwind delay (s)
0x002E	Blind 2 collapse delay (s)
0x002F	Blind 2 slats rotate time
0x0030	Blind 1 location id low byte
0x0031	Blind 1 location id highbyte
0x0032	Blind 1 group id low byte
0x0033	Blind 1 group id high byte
0x0034	Blind 1 circuit id low byte
0x0035	Blind 1 circuit id high byte
0x0036	Blind 1 load id low byte
0x0037	Blind 1 load id high byte
0x0038	Led feedback for 0% and 100%
0x0039	Not used
...	...
0x003F	Not used
0x0040	Not used
0x0041	Not used
0x0042	Not used
0x0043	Alarm clock configuration
0x0044	Wake up 1 hour (0...23)
0x0045	Wake up 1 minutes (0...59)
0x0046	Go to bed 1 hour (0...23)
0x0047	Go to bed 1 minutes (0...59)
0x0048	Wake up 2 hour (0...23)
0x0049	Wake up 2 minutes (0...59)
0x004A	Go to bed 2 hour (0...23)
0x004B	Go to bed 2 minutes (0...59)
0x004C	Sunrise hour at 21 December (0...23)
0x004D	Sunrise minutes at 21 December (0...59)
0x004E	Sunrise 21 January – sunrise 5 January (-128'...127')
0x004F	Sunrise 5 February – sunrise 21 January (-128'...127')
0x0050	Sunrise 21 February – sunrise 5 February (-128'...127')
0x0051	Sunrise 5 March – sunrise 21 February (-128'...127')
0x0052	Sunrise 21 March – sunrise 5 March (-128'...127')
0x0053	Sunrise 5 April – sunrise 21 March (-128'...127')
0x0054	Sunrise 21 April – sunrise 5 April (-128'...127')
0x0055	Sunrise 5 May – sunrise 21 April (-128'...127')
0x0056	Sunrise 21 May – sunrise 5 May (-128'...127')
0x0057	Sunrise 5 June – sunrise 21 May (-128'...127')
0x0058	Sunrise 21 June – sunrise 5 June (-128'...127')

0x0059	Sunrise 5 July – sunrise 21 June (-128'...127')
0x005A	Sunrise 21 July – sunrise 5 July (-128'...127')
0x005B	Sunrise 5 August – sunrise 21 July (-128'...127')
0x005C	Sunrise 21 August – sunrise 5 August (-128'...127')
0x005D	Sunrise 5 September – sunrise 21 August (-128'...127')
0x005E	Sunrise 21 September – sunrise 5 September (-128'...127')
0x005F	Sunrise 5 October – sunrise 21 Sept. (-128'...127')
0x0060	Sunrise 21 October – sunrise 5 October (-128'...127')
0x0061	Sunrise 5 November – sunrise 21 Oct. (-128'...127')
0x0062	Sunrise 21 November – sunrise 5 November (-128'...127')
0x0063	Sunrise 5 December – sunrise 21 Nov. (-128'...127')
0x0064	Sunrise 21 December – sunrise 5 December (-128'...127')
0x0065	Sunrise 5 January – sunrise 21 December (-128'...127')
0x0066	Not used
0x0067	Not used
0x0068	Sunset hour at 21 December (0...23)
0x0069	Sunset minutes at 21 December (0...59)
0x006A	Sunset 21 January – sunset 5 January (-128'...127')
0x006B	Sunset 5 February – sunset 21 January (-128'...127')
0x006C	Sunset 21 February – sunset 5 February (-128'...127')
0x006D	Sunset 5 March – sunset 21 February (-128'...127')
0x006E	Sunset 21 March – sunset 5 March (-128'...127')
0x006F	Sunset 5 April – sunset 21 March (-128'...127')
0x0070	Sunset 21 April – sunset 5 April (-128'...127')
0x0071	Sunset 5 May – sunset 21 April (-128'...127')
0x0072	Sunset 21 May – sunset 5 May (-128'...127')
0x0073	Sunset 5 June – sunset 21 May (-128'...127')
0x0074	Sunset 21 June – sunset 5 June (-128'...127')
0x0075	Sunset 5 July – sunset 21 June (-128'...127')
0x0076	Sunset 21 July – sunset 5 July (-128'...127')
0x0077	Sunset 5 August – sunset 21 July (-128'...127')
0x0078	Sunset 21 August – sunset 5 August (-128'...127')
0x0079	Sunset 5 September – sunset 21 August (-128'...127')
0x007A	Sunset 21 September – sunset 5 September (-128'...127')
0x007B	Sunset 5 October – sunset 21 September (-128'...127')
0x007C	Sunset 21 October – sunset 5 October (-128'...127')
0x007D	Sunset 5 November – sunset 21 October (-128'...127')
0x007E	Sunset 21 November – sunset 5 November (-128'...127')
0x007F	Sunset 5 December – sunset 21 Nov. (-128'...127')
0x0080	Sunset 21 December – sunset 5 December (-128'...127')
0x0081	Sunset 5 January – sunset 21 December (-128'...127')
0x0082	Not used
0x0083	Not used

# **Remark:**

Unused locations contain H'FF'

## **Blind timeout**

Contents	Time out
0	0s (no timer)
1	1s
2	2s
3	3s
...	
119	1min59s
120	2min
121	2min15s
...	
131	4min45s
132	5min
133	5min30s
...	
255	5min30s

**Blind slats rotate time**

<b>Contents</b>	<b>Rotate time</b>
0	No rotating slats blind (default)
1	1 sec
2	2 sec
...	...
10	10 sec
...	
255	10 sec

**Led feedback for 0% and 100%**

<b>Contents</b>	<b>Led feedback 0% and 100%</b>
0x00	Off
0xFF	On (factory default)

**Alarm clock configuration**

<b>Contents</b>	<b>Channel locked/unlocked</b>
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
0x0084	Links in use byte 0 (LSB)
0x0085	Links in use high byte 1
0x0086	Links in use low byte 2
0x0087	Links in use low byte 3 (MSB)
0x0088	Linked Push button 1 module address
0x0089	Linked Push button 1 bit number
0x008A	Linked Push button 1 action
0x008B	Linked Push button 1 parameter 1
0x008C	Linked Push button 1 parameter 2
0x008D	Linked Push button 1 parameter 3
...	...
0x041E	Linked Push button 154 module address
0x041F	Linked Push button 154 bit number
0x0420	Linked Push button 154 action
0x0421	Linked Push button 154 parameter 1
0x0422	Linked Push button 154 parameter 2
0x0423	Linked Push button 154 parameter 3

**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
0	Fully up at short press; up while long pressed	Pulse time		Channel
1	Direct up	Delayed on time		Channel
2	Up while pressed	Pulse time		Channel
3	Fully down at short press; down while long pressed	Pulse time		Channel
4	Direct Down	Delayed on time		Channel
5	Down while pressed	Pulse time		Channel
6	Up/down			Channel
7	Go to position	Delayed on time	Position (0 to 100%)	Channel
8	Fully up at short press; up while long pressed in mode 1	Pulse time		Channel
9	Direct up in mode 1	Delayed on time		Channel
10	Up while pressed in mode 1	Pulse time		Channel
11	Fully down at short press; down while long pressed in mode 1	Pulse time		Channel
12	Direct down in mode 1	Delayed on time		Channel
13	Down while pressed in mode 1	Pulse time		Channel
14	Up/down in mode 1			Channel
15	Go to position in mode 1	Delayed on time	Position (0 to 100%)	Channel
16	Select mode 1			Channel
17	Select/deselect mode 1			Channel
18	Deselect mode			Channel
19	Fully up at short press; up while long pressed in mode 2	Pulse time		Channel
20	Direct up in mode 2	Delayed on time		Channel
21	Up while pressed in mode 2	Pulse time		Channel
22	Fully down at short press; down while long pressed in mode 2	Pulse time		Channel
23	Direct down in mode 2	Delayed on time		Channel
24	Down while pressed in mode 2	Pulse time		Channel
25	Up/down in mode 2			Channel
26	Go to position in mode 2	Delayed on time	Position (0 to 100%)	Channel
27	Select mode 2			Channel
28	Select/deselect mode 2			Channel
29	Fully up at short press; up while long pressed in mode 3	Pulse time		Channel
30	Direct up in mode 3	Delayed on time		Channel
31	Up while pressed in mode 3	Pulse time		Channel
32	Fully down at short press; down while long pressed in mode 3	Pulse time		Channel
33	Direct down in mode 3	Delayed on time		Channel
34	Down while pressed in mode 3	Pulse time		Channel

35	Up/down in mode 3			Channel
36	Go to position in mode 3	Delayed on time	Position (0 to 100%)	Channel
37	Select mode 3			Channel
38	Select/deselect mode 3			Channel
39	Lock at closed/open switch			Channel
40	Lock	Timeout		Channel
41	Lock/unlock	Timeout		Channel
42	Unlock			Channel
43	Forced up at closed/open switch			Channel
44	Forced up	Timeout		Channel
45	Forced up/cancel forced up	Timeout		Channel
46	Cancel forced up			Channel
47	Forced down at closed/open switch			Channel
48	Forced down	Timeout		Channel
49	Forced down/cancel forced down	Timeout		Channel
50	Cancel forced down			Channel
51	Inhibit at closed/open switch			Channel
52	Inhibit	Timeout		Channel
53	Inhibit/cancel inhibit	Timeout		Channel
54	Cancel inhibit			Channel
55	Inhibit preset up at closed/open switch			Channel
56	Inhibit preset up	Timeout		Channel
57	Inhibit preset up/cancel inhibit preset up	Timeout		Channel
58	Cancel inhibit preset up			Channel
59	Inhibit preset down at closed/open switch			Channel
60	Inhibit preset down	Timeout		Channel
61	Inhibit preset down/cancel inhibit preset down	Timeout		Channel
62	Cancel inhibit preset down			Channel
63	Disable channel program at closed/open switch			Channel
64	Disable channel program	Time-out		Channel
65	Disable/enable channel program	Time-out		Channel
66	Enable channel program			Channel
67	Select no programs			
68	Select program group 1			
69	Toggle program group 1			
70	Select program group 2			
71	Toggle program group 2			
72	Select program group 3			
73	Toggle program group 3			
74	Enable Alarm 1 at closed/open switch			
75	Disable Alarm 1 at closed/open switch			
76	Enable Alarm 1			
77	Enable/Disable Alarm 1			
78	Disable Alarm 1			
79	Enable Alarm 2 at closed/open switch			
80	Disable Alarm 2 at closed/open switch			
81	Enable Alarm 2			
82	Enable/Disable Alarm 2			
83	Disable Alarm 2			
84	Enable Sunrise at closed/open switch			
85	Disable Sunrise at closed/open switch			
86	Enable Sunrise			
87	Enable/Disable Sunrise			
88	Disable Sunrise			
89	Enable Sunset at closed/open switch			
90	Disable Sunset at closed/open switch			
91	Enable Sunset			
92	Enable/Disable Sunset			
93	Disable Sunset			

Parameter 1: time-out

Parameter 1	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 1: delayed on time

Parameter 1	time
0	0s
1	1s
2	2s
3	3s
...	
119	1min59s
120	2min
121	2min15s
...	
131	4min45s
132	5min
133	5min30s
...	
150	14min
...	
255	14min

#### Parameter 1: pulse time

Parameter 1	time
0	No pulse
1	0.01 s
2	0.02 s
...	
255	2.55 s

#### Parameter 3: channel number

Parameter 4	Channel
1	Channel 1
2	Channel 2

## Program Steps

Address	Contents
0x0424	Program steps used byte 0 (LSB)
0x0425	Program steps used byte 1
0x0426	Program steps used byte 2
0x0427	Program steps used byte 3 (MSB)
0x0428	Program step 1 byte1
0x0429	Program step 1 byte2
0x042A	Program step 1 byte3
0x042B	Program step 1 byte4
0x042C	Program step 1 byte5
0x042D	Program step 1 byte6
...	..
0x07B2	Program step 152 byte1
0x07B3	Program step 152 byte2
0x07B4	Program step 152 byte3
0x07B5	Program step 152 byte4
0x07B6	Program step 152 byte5
0x07B7	Program step 152 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

<b>Contents program byte3</b>	<b>Description</b>
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)

<b>Contents program byte4</b>	<b>Description</b>
B'xx000000'	0min
B'xx000001'	1min
...	...
B'xx111011'	59min

<b>Contents program byte4</b>	<b>Contents program byte2</b>	<b>Description</b>
B'00xxxxxx'	B'0000xxxx'	Never
B'00xxxxxx'	B'0001xxxx'	Day 1 of the month
B'00xxxxxx'	B'0010xxxx'	Day 2 of the month
...	...	...
B'01xxxxxx'	B'1111xxxx'	Day 31 of 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

<b>Contents program byte5</b>	<b>Action</b>
0	Down
1	Up
2	Locked
3	Cancel locked
4	Forced down
5	Cancel forced down
6	Forced up
7	Cancel forced up
8	Inhibit
9	Inhibit preset down
10	Inhibit preset up
11	Cancel Inhibit
12	Deselect mode
13	Select mode 1
14	Select mode 2
15	Select mode 3

<b>Contents program byte6</b>	<b>Channel</b>
0	Program step = empty
1	Channel 1
2	Channel 2
255	Program step = empty

## Miscellaneous

<i>Address</i>	<i>Contents</i>
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)