VMB6PB-20

6 button interface module for VELBUS system

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)

The module can transmit the following messages:

- Power up message
- Channel status
- Module status
- Module type
- Bus error counter status
- First, second and third part of the channel names
- Memory data
- Memory data block (4 bytes)
- Real-time clock status
- Date status
- Daylight savings status
- Real-time clock status request
- Clear linked push button led
- Set linked push button led
- Slow blink linked push button led
- Fast blink linked push button led
- Program step info

The module can receive the following commands:

- Power up message
- Linked push button status
- Module type request
- Module status request
- Channel name request
- Clear channel led
- Set channel led
- Slow blink channel led
- Fast blink channel led
- Very fast channel led
- Update channel leds
- Read memory data
- Read memory data block (4 bytes)
- Memory dump request
- Write memory data

- Write memory data block (4 bytes)
- Bus error counter status request
- Real-time clock status request
- Set real-time clock
- Set date
- Set daylight savings
- Enable/disable global sunrise/sunset related actions
- Enable/disable local sunrise/sunset related actions
- Set local alarm clock
- Set global alarm clock
- Lock channel
- Unlock channel
- Disable channel program
- Enable channel program
- Select program
- Read program step
- Write program step

Transmits 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

Transmits 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)

Transmits the 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)

Transmits the 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

Transmits the 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

Transmits the channel switch 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 just pressed
DATABYTE3 = Channel just released
DATABYTE4 = Channel long pressed

Transmits the 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 = VMB6PB-20 type (0x4C)
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

Transmits the module status:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 7 data bytes to send
DATABYTE1 = COMMAND_MODULE_STATUS (0xED)
DATABYTE2 = channel 1 to 8 status (1 = pressed / 0 = released)
DATABYTE3 = enabled/disable channel status (1 = enabled / 0 = disabled)
DATABYTE4 = normal/inverted channel status (1 = normal / 0 = inverted)

Contents	***Description***
B'xxxxxxx0'	Button 1 (ch 1) inverted
B'xxxxxxx1'	Button 1 (ch 1) normal
B'xxxxxx0x'	Button 2 (ch 2) inverted
B'xxxxxx1x'	Button 2 (ch 2) normal
B'xxxxx0xx'	Button 3 (ch 3) inverted
B'xxxxx1xx'	Button 3 (ch 3) normal
B'xxxx0xxx'	Button 4 (ch 4) inverted
B'xxxx1xxx'	Button 4 (ch 4) normal
B'xxx0xxxx'	Button 5 (ch 5) inverted
B'xxx1xxxx'	Button 5 (ch 5) normal
B'xx0xxxxx'	Button 6 (ch 6) inverted
B'xx1xxxxx'	Button 6 (ch 6) normal
B'x1xxxxxx'	Virtual button 1 (ch 7) normal
B'1xxxxxxx'	Virtual button 2 (ch 8) normal

DATABYTE5 = locked channel status (0 = unlocked / 1 = locked)
DATABYTE6 = disabled channel program status (0 = program enabled / 1 = program disabled)
DATABYTE7 = alarm & program selection

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

Transmit: 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

Transmits the 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 0x03FF

Transmits 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 0x03FC

Transmits 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 (0x0400 – memory block length)

Transmits the 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 number 1…8 for buttons
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

Transmits the 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 number 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

Transmits the 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 number 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 0xFF.

Transmit: 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 (1 = clear LED)

Transmit: 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 (1 = set LED)

Transmit: 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 (1 = slow blink LED)

Transmits 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…70 / 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**
0	0s25 Pulse
1	1s Pulse
2	2s Pulse
…	…
119	1min59s Pulse
120	2min Pulse
121	2min15s Pulse
…	…
131	4min45s Pulse
132	5min Pulse
133	5min30s Pulse
…	…
181	29min30s Pulse
182	30min Pulse
183	31min Pulse
…	…
211	59min Pulse
212	1h Pulse
213	1h15min Pulse
…	…
227	4h45min Pulse
228	5h Pulse
229	5h30min Pulse
…	…
237	9h30min Pulse
238	10h Pulse
239	11h Pulse
…	…
245	17h Pulse
246	18h Pulse
247	Press
248	Long press
249	Release
250	Lock
251	Unlock
252	No action
253	…
255	No action

DATABYTE8 = Channel

Contents	Channel
1	Channel 1
2	Channel 2
...	…
7	Channel 7
8	Channel 8

'Linked push button status' received:

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 (1 = just pressed)
DATABYTE3 = Linked push buttons just released (1 = just released)
DATABYTE4 = linked push buttons long pressed (1 = longer than 0.85s pressed)

Power up message' received:

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

'CAN FD enable command' received:

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)

'Real time clock status request' command received:

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

'Set real time clock' command received:

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

Contents day of week'	***Description***
0	Monday
1	Tuesday
2	Wednesday
3	Thursday
4	Friday
5	Saterday
6	Sunday

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

'Set date' command received:

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

'Set daylight savings' command received:

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

'Enable/disable global sunrise/sunset related actions' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = 0x00
RTR = 0
DLC3...DLC0 = 3 data bytes to send
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

'Enable/disable local sunrise/sunset related actions' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 3 data bytes to send
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

'Set global clock alarm' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = 0x00
RTR = 0
DLC3...DLC0 = 7 data bytes to send
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)

'Set local clock alarm' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 7 data bytes to send
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)

'Module type request' command received:

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

'Module status request' command received:
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

'Channel name request' command received:
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 number 1…8 for buttons (255 for all channels)

'Clear channel LED' command received:
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 (a one clears the corresponding LED of channel 1 to 8)

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

'Set channel LED' command received:
SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 2 data bytes received
DATABYTE1 = COMMAND_SET_LED (0xF6)
DATABYTE2 = LEDs to set (a one sets the corresponding LED of channel 1 to 8)

'Slow blink channel LED' command received:
SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 2 data bytes received
DATABYTE1 = COMMAND_SLOW_BLINK_LED (0xF7)
DATABYTE2 = LEDs to blink slow (a one blinks slow the corresponding LED of channel 1 to 8)

'Fast blink channel LED' command received:
SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 2 data bytes received
DATABYTE1 = COMMAND_FAST_BLINK_LED (0xF8)
DATABYTE2 = LEDs to blink fast (a one blinks fast the corresponding LED of channel 1 to 8)

'Very fast blink channel LED' command received:
SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 2 data bytes received
DATABYTE1 = COMMAND_VERY_FAST_BLINK_LED (0xF9)
DATABYTE2 = LEDs to blink very fast (a one blinks very fast the corresponding LED of channel 1 to 8)

'Update channel LEDs' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 4 data bytes received
DATABYTE1 = COMMAND_UPDATE_LED_STATUS (0xF4)
DATABYTE2 = LEDs to set (a one sets the corresponding LED of channel 1 to 8)
DATABYTE3 = LEDs to blink slow (a one blinks slow the corresponding LED of channel 1 to 8)
DATABYTE4 = LEDs to blink fast (a one blinks very fast the corresponding LED of channel 1 to 8)

Remark:
The 'LEDs to set' status overrides the blinking modes.
Very fast blinking if slow & fast blinking are set.

'Read data from memory' command received:

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 0x03FF

'Memory dump request' command received:

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

'Read data block from memory' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 3 data bytes for standard CAN 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 0x03FC for standard CAN response
address range: 0x0000 to (0x0400 – memory block length) for CAN FD response

'Write data to memory' command received:

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 (0x00...0xFF)
DATABYTE4 = memory data to write

Remark:
Wait at least 10ms for sending a next command on the velbus.
Address range: 0x0000 to 0x03FF
Terminate always with a write command at the last memory location.

'Write memory block' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Address of the module
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 0x03FC for standard CAN response
address range: 0x0000 to (0x0400 – memory block length) for CAN FD response
Contents of unused data bytes = 0x55
Terminate always with a write command at the last memory location.

'Bus error counter status request' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 1 data bytes to send
DATABYTE1 = COMMAND_BUS_ERROR_CONTER_STATUS_REQUEST (0xD9)

'Unlock channel' command received:

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 number 1…8 for buttons (255 for all channels)

'Lock channel' command received:

SID10-SID9 = 00 (highest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 5 data bytes received
DATABYTE1 = COMMAND_FORCED_OFF (0x12)
DATABYTE2 = Channel number 1…8 for buttons (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 0xFFFFFF then the channel will be permanently locked.

'Enable Channel Program' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 2 data bytes received
DATABYTE1 = COMMAND_ENABLE_PROGRAM (0xB2)
DATABYTE2 = Channel number 1…8 for buttons (255 for all channels)

'Disable Channel Program' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 5 data bytes received
DATABYTE1 = COMMAND_DISABLE_PROGRAM (0xB1)
DATABYTE2 = Channel number 1…8 for buttons (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 0xFFFFFF then the channel program will be permanently disabled.

'Select Program' command received:

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
2	Program group 2
3	Program group 3

'Read program step' command received:

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…70)
DATABYTE3 = Program group number (1…3)
DATABYTE4 = channel number 1…8 for buttons
DATABYTE5 = Search direction (1 = search for next matched step / 0 = search for previous matched program step)

'Write program step' command received:

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…70)
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**
0	0s25 Pulse
1	1s Pulse
2	2s Pulse
...	...
119	1min59s Pulse
120	2min Pulse
121	2min15s Pulse
...	...
131	4min45s Pulse
132	5min Pulse
133	5min30s Pulse
...	...
181	29min30s Pulse
182	30min Pulse
183	31min Pulse
...	...
211	59min Pulse
212	1h Pulse
213	1h15min Pulse
...	...
227	4h45min Pulse
228	5h Pulse
229	5h30min Pulse
...	...
237	9h30min Pulse
238	10h Pulse
239	11h Pulse
...	…
246	18h Pulse
247	Press
248	Long Press
249	Release
250	Lock
251	Unlock
252	No action
…	…
255	No action

DATABYTE8 = Channel

Contents	Channel
1	Channel 1
2	Channel 2
...	…
7	Channel 7
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 (0x4C = VMB6PB-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 2:

Addr	*Contents*	*Addr*	*Contents*
0x0000	Channel 1 name character 1	0x0001	Channel 1 name character 2
...	...	...	...
0x000E	Channel 1 name character 15	0x000F	Channel 1 name character 16
0x0010	Channel 1 reaction time	0x0011	Channel 1 start function
0x0012	Channel 1 end function	0x0013	Channel 1 mode
0x0014	Channel 2 name character 1	0x0015	Channel 2 name character 2
...	...	...	...
0x0022	Channel 2 name character 15	0x0023	Channel 2 name character 16
0x0024	Channel 2 reaction time	0x0025	Channel 2 start function
0x0026	Channel 2 end function	0x0027	Channel 2 mode
...	...	...	...
0x008C	Channel 8 name character 1	0x008D	Channel 8 name character 2
...	...	...	...
0x009A	Channel 8 name character 15	0x009B	Channel 8 name character 16
0x009C	Channel 8 reaction time	0x009D	Channel 8 start function
0x009E	Channel 8 end function	0x009F	Channel 8 mode
0x00A0	Long pressed delay	0x00A1	Dual function long pressed time
0x00A2	Led backlight intensity	0x00A3	Led intensity
0x00A4	Led driver configuration	0x00A5	Not used
0x00A6	Not used	0x00A7	Alarm clock configuration
0x00A8	Wake up 1 hour (0…23)	0x00A9	Wake up 1 minutes (0…59)
0x00AA	Go to bed 1 hour (0…23)	0x00AB	Go to bed 1 minutes (0…59)
0x00AC	Wake up 2 hour (0…23)	0x00AD	Wake up 2 minutes (0…59)
0x00AE	Go to bed 2 hour (0…23)	0x00AF	Go to bed 2 minutes (0…59)
0x00B0	Sunrise hour at 21 December (0…23)	0x00B1	Sunrise minutes at 21 December (0…59)
0x00B2	Sunrise 21 January – sunrise 5 January (-128'...127')	0x00B3	Sunrise 5 February – sunrise 21 January (-128'...127')
0x00B4	Sunrise 21 February – sunrise 5 February (-128'...127')	0x00B5	Sunrise 5 March – sunrise 21 February (-128'...127')
0x00B6	Sunrise 21 March – sunrise 5 March (-128'...127')	0x00B7	Sunrise 5 April – sunrise 21 March (-128'...127')
0x00B8	Sunrise 21 April – sunrise 5 April (-128'...127')	0x00B9	Sunrise 5 May – sunrise 21 April (-128'...127')
0x00BA	Sunrise 21 May – sunrise 5 May (-128'...127')	0x00BB	Sunrise 5 June – sunrise 21 May (-128'...127')
0x00BC	Sunrise 21 June – sunrise 5 June (-128'...127')	0x00BD	Sunrise 5 July – sunrise 21 June (-128'...127')
0x00BE	Sunrise 21 July – sunrise 5 July (-128'...127')	0x00BF	Sunrise 5 August – sunrise 21 July (-128'...127')
0x00C0	Sunrise 21 August – sunrise 5 August (-128'...127')	0x00C1	Sunrise 5 September – sunrise 21 August (-128'...127')
0x00C2	Sunrise 21 September – sunrise 5 September (-128...127')	0x00C3	Sunrise 5 October – sunrise 21 September (-128'...127')
0x00C4	Sunrise 21 October – sunrise 5 October (-128'...127')	0x00C5	Sunrise 5 November – sunrise 21 October (-128'...127')
0x00C6	Sunrise 21 November – sunrise 5 November (-128'...127')	0x00C7	Sunrise 5 December – sunrise 21 November (-128'...127')
0x00C8	Sunrise 21 December – sunrise 5 December (-128'...127')	0x00C9	Sunrise 5 January – sunrise 21 December (-128'…127')

Addr	*Contents*	*Addr*	*Contents*
0x00CA	Not used	0x00CB	Not used
0x00CC	Sunset hour at 21 December (0…23)	0x00CD	Sunset minutes at 21 December (0…59)
0x00CE	Sunset 21 January – sunrise 5 January (-128'...127')	0x00CF	Sunset 5 February – sunrise 21 January (-128'...127')
0x00D0	Sunset 21 February – sunrise 5 February (-128'...127')	0x00D1	Sunset 5 March – sunrise 21 February (-128'...127')
0x00D2	Sunset 21 March – sunrise 5 March (-128'...127')	0x00D3	Sunset 5 April – sunrise 21 March (-128'...127')
0x00D4	Sunset 21 April – sunrise 5 April (-128'...127')	0x00D5	Sunset 5 May – sunrise 21 April (-128'...127')
0x00D6	Sunset 21 May – sunrise 5 May (-128'...127')	0x00D7	Sunset 5 June – sunrise 21 May (-128'...127')
0x00D8	Sunset 21 June – sunrise 5 June (-128'...127')	0x00D9	Sunset 5 July – sunrise 21 June (-128'...127')
0x00DA	Sunset 21 July – sunrise 5 July (-128'...127')	0x00DB	Sunset 5 August – sunrise 21 July (-128'...127')
0x00DC	Sunset 21 August – sunrise 5 August (-128'...127')	0x00DD	Sunset 5 September – sunrise 21 August (-128'...127')
0x00DE	Sunset 21 September – sunrise 5 September (-128'...127')	0x00DF	Sunset 5 October – sunrise 21 September (-128'...127')
0x00E0	Sunset 21 October – sunrise 5 October (-128'...127')	0x00E1	Sunset 5 November – sunrise 21 October (-128'...127')
0x00E2	Sunset 21 November – sunrise 5 November (-128'...127')	0x00E3	Sunset 5 December – sunrise 21 November (-128'...127')
0x00E4	Sunset 21 December – sunrise 5 December (-128'...127')	0x00E5	Sunset 5 January – sunrise 21 December (-128'...127')
0x00E6	Not used	0x00E7	Not used

Remark:
Unused locations contain 0xFF

Valid reaction times

Contents	*Reaction time*
0x01	Immediately (0.065s) (default)
0x0E	0.5s
0x1C	1s
0x38	2s
0x54	3s
0xFF	Channel disabled

Channel x start/end function

Contents	*Function*
1	Channel 1
2	Channel 2
...	...
7	Channel 7
8	Channel 8

Remark:
For a normal one function button, the start and end function channel are the same.
For a multi-function button, the start function channel must be less than the end function. At every press the next channel will be send. When the end function channel is reached, the start channel will be send again at the next press.
For a dual function button, the start function channel will be send at a short press or the end function will be send at a long press.

Channels mode

Contents	*Description*
B'xxxxxxx0'	Dual function disabled (default)
B'xxxxxxx1'	Dual function enabled
B'xxxxxx0x'	Multi-function auto reset disabled (default)
B'xxxxxx1x'	Multi-function auto reset enabled
B'xxxxx0xx'	Led backlight off
B'xxxxx1xx'	Led backlight on
B'xxxx0xxx'	Led monitor mode
B'xxxx1xxx'	Led feedback mode (default)
B'xxx0xxxx'	Slow blinking led feedback disabled
B'xxx1xxxx'	Slow blinking led feedback enabled (default)
B'xx0xxxxx'	Fast blinking led feedback disabled
B'xx1xxxxx'	Fast blinking led feedback enabled (default)
B'x0xxxxxx'	Very fast blinking led feedback disabled
B'x1xxxxxx'	Very fast blinking led feedback enabled (default)
B'0xxxxxxx'	Channel inverted
B'1xxxxxxx'	Channel normal (fixed for vitual buttons ch7 & ch8)

Remark:
When auto reset is enabled, the start function will be loaded again after 3 seconds inactivity of the channel.
For a dual function button, the start function channel will be send at a short press or the end function will be send at a long press.
The dual function overwrites the multi-function mode.

Valid long pressed delay

Contents	*Reaction time*
0x17	0.8s
0x2E	1.6s

Valid dual function long pressed times

Contents	*Long pressed time*
0x1C	1s
0x38	2s
0x54	3s

Led intensity

Contents	*Led intensity*
0x00	Minimum
...	...
0xFF	Maximum

Led driver configuration

Contents	*Led driver*
B'xxxxxx00'	Common anode led driver
B'xxxxxx01'	Common cathode led driver
B'xxxxxx1x'	Disabled

Alarm clock configuration

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

Address	*Contents*	*Address*	*Contents*
0x00E8	Links in use byte 0 (LSB)	0x00E9	Links in use high byte1
0x00EA	Links in use low byte 2	0x00EB	Links in use low byte 3 (MSB)
0x00EC	Linked Push button 1 module address	0x00ED	Linked Push button 1 bit number
0x00EE	Linked Push button 1 action	0x00EF	Linked Push button 1 parameter 1
0x00F0	Linked Push button 1 parameter 2	…	…
...	...	...	...
...	…	0x023B	Linked Push button 68 module address
0x023C	Linked Push button 68 bit number	0x023D	Linked Push button 68 action
0x023E	Linked Push button 68 parameter 1	0x023F	Linked Push button 68 parameter 2

Remark: Unused locations contain 0xFF

Action

Action number	**Action**	**Parameter 1**	**Parameter 2**
0	Switch status led indication	-	Channel 1…8
1	Lock channel at closed switch	-	Channel 1…8
2	Lock channel at opened switch	-	Channel 1…8
3	Lock channel	Timeout	Channel 1…8
4	Lock/unlock channel	Timeout	Channel 1…8
5	Unlock channel	-	Channel 1…8
6	Disable channel program at closed switch	-	Channel 1…8
7	Disable channel program at opened switch	-	Channel 1…8
8	Disable channel program channel	Timeout	Channel 1…8
9	Disable/enable channel program	Timeout	Channel 1…8
10	Enable channel program	-	Channel 1…8
11	Select no programs	-	-
12	Select program group 1	-	-
13	Toggle program group 1	-	-
14	Select program group 2	-	-
15	Toggle program group 2	-	-
16	Select program group 3	-	-
17	Toggle program group 3	-	-
18	Enable Alarm 1 at closed switch	-	-
19	Enable Alarm 1 at open switch	-	-
20	Disable Alarm 1 at closed switch	-	-
21	Disable Alarm 1 at open switch	-	-
22	Enable Alarm 1	-	-
23	Enable/Disable Alarm 1	-	-
24	Disable Alarm 1	-	-
25	Enable Alarm 2 at closed switch	-	-
26	Enable Alarm 2 at open switch	-	-
27	Disable Alarm 2 at closed switch	-	-
28	Disable Alarm 2 at open switch	-	-
29	Enable Alarm 2	-	-
30	Enable/Disable Alarm 2	-	-
31	Disable Alarm 2	-	-
32	Enable Sunrise at closed switch	-	-
33	Enable Sunrise at open switch	-	-
34	Disable Sunrise at closed switch	-	-
35	Disable Sunrise at open switch	-	-
36	Enable Sunrise	-	-
37	Enable/Disable Sunrise	-	-
38	Disable Sunrise	-	-
39	Enable Sunset at closed switch	-	-
40	Enable Sunset at open switch	-	-
41	Disable Sunset at closed switch	-	-
42	Disable Sunset at open switch	-	-
43	Enable Sunset	-	-
44	Enable/Disable Sunset	-	-
45	Disable Sunset	-	-

Time parameter

Time parameter	Timeout
0	0s (No timer)
1	1s
2	2s
...	
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

Address	*Contents*	*Address*	*Contents*
0x0240	Program steps used byte 0 (LSB)	0x0241	Program steps used byte 1
0x0242	Program steps used byte 2	0x0243	Program steps used byte 3 (MSB)
0x0244	Program step 1 byte1	0x0245	Program step 1 byte2
0x0246	Program step 1 byte3	0x0247	Program step 1 byte4
0x0248	Program step 1 byte5	0x0249	Program step 1 byte6
…	..	..	..
0x03B2	Program step 62 byte1	0x03B3	Program step 62 byte2
0x03B4	Program step 62 byte3	0x03B5	Program step 62 byte4
0x03B6	Program step 62 byte5	0x03B7	Program step 62 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
B’x1xxxxxx’	Program group 2
B’1xxxxxxx’	Program group 3

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**
0	0s25 Pulse
1	1s Pulse
2	2s Pulse
...	...
119	1min59s Pulse
120	2min Pulse
121	2min15s Pulse
...	...
131	4min45s Pulse
132	5min Pulse
133	5min30s Pulse
...	...
181	29min30s Pulse
182	30min Pulse
183	31min Pulse
...	...
211	59min Pulse
212	1h Pulse
213	1h15min Pulse
...	...
227	4h45min Pulse
228	5h Pulse
229	5h30min Pulse
...	...
237	9h30min Pulse
238	10h Pulse
239	11h Pulse
...	…
246	18h Pulse
247	Press
248	Long Press
249	Release
250	Lock
251	Unlock
252	No action
…	…
255	No action

Contents program byte6	**Channel**
1	Channel 1
2	Channel 2
3	Channel 3
4	Channel 4
5	Channel 5
6	Channel 6
7	Channel 7
8	Channel 8

Address	*Contents*	*Address*	*Contents*
0x03B8	Location id low byte	0x03B9	Location id high byte
0x03BA	Group id low byte	0x03BB	Group id high byte
0x03BC	Module name character 1	0x03BD	Module name character 2
…	..	..	..
0x03FA	Module name character 63	0x03FB	Module name character 64
0x03FC	Not used	0x03FD	Not used
0x03FE	Not used	0x03FF	Used for flash writing