VMB8IN-20

8 channel input 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, sub-address1, sub-address2 or sub-address3
 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 = VMB8IN-20 type (0x4E)
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 subtype:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 8 data bytes to send
DATABYTE1 = COMMAND_SUBTYPE (0xB0)
DATABYTE2 = VMB8IN-20 type (0x4E)
DATABYTE3 = High byte of serial number
DATABYTE4 = Low byte of serial number
DATABYTE5 = Subaddress1 (0xFF sub-address disabled)
DATABYTE6 = Subaddress2 (0xFF sub-address disabled)
DATABYTE7 = Subaddress3 (0xFF sub-address disabled)
DATABYTE8 = Subaddress4 (0xFF always disabled)

Transmits the module status:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 8 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 = input normal/inverted channel status (1 = normal / 0 = inverted)

Contents	Description
B'xxxxxxx0'	Input 1 (ch 1) inverted
B'xxxxxxx1'	Input 1 (ch 1) normal
B'xxxxxx0x'	Input 2 (ch 2) inverted
B'xxxxxx1x'	Input 2 (ch 2) normal
B'xxxxx0xx'	Input 3 (ch 3) inverted
B'xxxxx1xx'	Input 3 (ch 3) normal
B'xxxx0xxx'	Input 4 (ch 4) inverted
B'xxxx1xxx'	Input 4 (ch 4) normal
B'xxx0xxxx'	Input 5 (ch 5) inverted
B'xxx1xxxx'	Input 5 (ch 5) normal
B'xx0xxxxx'	Input 6 (ch 6) inverted
B'xx1xxxxx'	Input 6 (ch 6) normal
B'x0xxxxxx'	Input 7 (ch 7) inverted
B'x1xxxxxx'	Input 7 (ch 7) normal
B'0xxxxxxx'	Input 8 (ch 8) inverted
B'1xxxxxxx'	Input 8 (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'	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 related program steps are disabled
B'x1xxxxxx'	Sunrise related program steps are enabled
B'0xxxxxxx'	Sunset related program steps are disabled
B'1xxxxxxx'	Sunset related program steps are enabled

DATABYTE8 = auto send interval
> 10…255s fixed interval
> 5…9 = auto send on change with 2s as minimum interval
> 1…4 = auto send on change disabled
> 0 = no change on auto send interval

Remark: the auto send interval is common for all channels

Transmits the module sub-status:
SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module sub address 1, sub address 2 or sub address 3
RTR = 0
DLC3...DLC0 = 5 data bytes to send
DATABYTE1 = COMMAND_MODULE_STATUS (0xED)
DATABYTE2 = alarm channel status (1 = pressed / 0 = released)
DATABYTE3 = enabled/disable channel status (1 = enabled / 0 = disabled)
DATABYTE4 = locked alarm channel status (0 = unlocked / 1 = locked)
DATABYTE5 = disabled alarm channel program status (0 = program enabled / 1 = program disabled)

Remark:
Alarm channels 9…16 for sub address 1
Alarm channels 15…24 for sub address 2
Alarm channels 24…32 for sub address 3

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 0x07FF

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 0x07FC

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 (0x0800 – 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…32
    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…32
    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…32
    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)

Transmit counter value:
    SID10-SID9 = 11 (lowest priority)
    SID8...SID1 = Module address
    RTR = 0
    DLC3...DLC0 = 8 data bytes to send
    DATABYTE1 = COMMAND_COUNTER_VALUE (0xA4)
    DATABYTE2 = counter channel 1 to 8 & value index

Contents	Description
B'0000xxxx'	Counter channel 1
…	
B'0111xxxx'	Counter channel 8
B'xxxxbbbb'	Highest nibble (bits 19…16) of Power

    DATABYTE3 = high byte of power
    DATABYTE4 = low byte of power
    DATABYTE5 = most significant byte of energy counter
    DATABYTE6 = upper byte of energy counter
    DATABYTE7 = high byte of energy counter
    DATABYTE8 = low byte of energy counter

    Remark: power in Watt and energy counter in Wh, l or ml

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…86 / 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

Contents	Description
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 (only for input channels)
1	1s Pulse (only for input channels)
2	2s Pulse (only for input channels)
...	...
119	1min59s Pulse (only for input channels)
120	2min Pulse (only for input channels)
121	2min15s Pulse (only for input channels)
...	...
131	4min45s Pulse (only for input channels)
132	5min Pulse (only for input channels)
133	5min30s Pulse (only for input channels)
...	...
181	29min30s Pulse (only for input channels)
182	30min Pulse (only for input channels)
183	31min Pulse (only for input channels)
...	...
211	59min Pulse (only for input channels)
212	1h Pulse (only for input channels)
213	1h15min Pulse (only for input channels)
...	...
227	4h45min Pulse (only for input channels)
228	5h Pulse (only for input channels)
229	5h30min Pulse (only for input channels)
...	...
237	9h30min Pulse (only for input channels)
238	10h Pulse (only for input channels)
239	11h Pulse (only for input channels)
...	...
245	17h Pulse (only for input channels)
246	18h Pulse (only for input channels)
247	Press (only for input channels)
248	Long press (only for input channels)
249	Release (only for input channels)
250	Lock
251	Unlock
252	No action
253	...
255	No action

DATABYTE8 = Channel

Contents	Channel
1	Channel 1
2	Channel 2
...	...
31	Channel 31
32	Channel 32

'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

'Counter status request' command received:
SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 3 data bytes received
DATABYTE1 = COMMAND_ENERGY_COUNTER_STATUS_RQ (0xBD)
DATABYTE2 = counter bitwise channels 1 to 8

Contents	Description
B'xxxxxxx1'	Channel 1
B'xxxxxx1x'	Channel 2
B'xxxxx1xx'	Channel 3
B'xxxx1xxx'	Channel 4
B'xxx1xxxx'	Channel 5
B'xx1xxxxx'	Channel 6
B'x1xxxxxx'	Channel 7
B'1xxxxxxx'	Channel 8

DATABYTE3 = auto send interval
    10…255s fixed interval
    5…9 = auto send on change with 2s as minimum interval
    1…4 = auto send on change disabled
    0 = no change on auto send interval

Remark: the auto send interval is common for all channels

'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…32 for buttons (255 for all channels)

'Clear channel LED' command received:
SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address, subaddress1, subaddress2 or subaddress3
RTR = 0
DLC3...DLC0 = 2 data bytes received
DATABYTE1 = COMMAND_CLEAR_LED (0xF5)
DATABYTE2 = LEDs to clear (a one clears the corresponding LED of the channel)

'Set channel LED' command received:
SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address, subaddress1, subaddress2 or subaddress3
RTR = 0
DLC3...DLC0 = 2 data bytes received
DATABYTE1 = COMMAND_SET_LED (0xF6)
DATABYTE2 = LEDs to set (a one sets the corresponding LED of the channel)

'Slow blink channel LED' command received:
    SID10-SID9 = 11 (lowest priority)
    SID8...SID1 = Module address, subaddress1, subaddress2 or subaddress3
    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 the channel)

'Fast blink channel LED' command received:
    SID10-SID9 = 11 (lowest priority)
    SID8...SID1 = Module address, subaddress1, subaddress2 or subaddress3
    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 the channel)

'Very fast blink channel LED' command received:
    SID10-SID9 = 11 (lowest priority)
    SID8...SID1 = Module address, subaddress1, subaddress2 or subaddress3
    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 the channel)

'Update channel LEDs' command received:
    SID10-SID9 = 11 (lowest priority)
    SID8...SID1 = Module address, subaddress1, subaddress2 or subaddress3
    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 the channel)
    DATABYTE3 = LEDs to blink slow (a one blinks slow the corresponding LED of the channel)
    DATABYTE4 = LEDs to blink fast (a one blinks very fast the corresponding LED of the channel)

    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 0x07FF

'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 0x07FC for standard CAN response
address range: 0x0000 to (0x0800 – 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 0x07FF
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 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.

'Load counter' command received:
SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Counter address
RTR = 0
DLC3...DLC0 = 7 data bytes received
DATABYTE1 = COMMAND_RESET_COUNTER (0xAD)
DATABYTE2 = counter channel 1 to 8

Contents	Description
0	Counter 1
1	Counter 2
2	Counter 3
3	Counter 4
4	Counter 5
5	Counter 6
6	Counter 7
7	Counter 8

DATABYTE3 = don't care
DATABYTE4 = highest byte of 32-bit counter value
DATABYTE5 = third byte of 32-bit counter value
DATABYTE6 = second byte of 32-bit counter value
DATABYTE7 = lowest byte of 32-bit counter value

'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…32 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...32 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...32 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...32 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...86)
DATABYTE3 = Program group number (1...3)
DATABYTE4 = channel number 1...32 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…86)
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 (only for input channels)
1	1s Pulse (only for input channels)
2	2s Pulse (only for input channels)
...	...
119	1min59s Pulse (only for button channels)
120	2min Pulse (only for button channels)
121	2min15s Pulse (only for input channels)
...	...
131	4min45s Pulse (only for input channels)
132	5min Pulse (only for input channels)
133	5min30s Pulse (only for input channels)
...	...
181	29min30s Pulse (only for input channels)
182	30min Pulse (only for input channels)
183	31min Pulse (only for input channels)
...	...
211	59min Pulse (only for input channels)
212	1h Pulse (only for input channels)
213	1h15min Pulse (only for input channels)
...	...
227	4h45min Pulse (only for input channels)
228	5h Pulse (only for input channels)

	Contents		Action	
	229		5h30min Pulse (only for input channels)	
	...		...	
	237		9h30min Pulse (only for input channels)	
	238		10h Pulse (only for input channels)	
	239		11h Pulse (only for input channels)	
	...		…	
	246		18h Pulse (only for input channels)	
	247		Press (only for input channels)	
	248		Long Press (only for input channels)	
	249		Release (only for input channels)	
	250		Lock	
	251		Unlock	
	252		No action	
	…		…	
	255		No action	

DATABYTE8 = Channel

Contents	Channel
1	Channel 1
2	Channel 2
...	…
31	Channel 31
32	Channel 32

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

Memory map:

Addr	Contents	Addr	Contents
0x0000	Channel 1 (input/counter-alarm) name character 1	0x0001	Channel 1 (input/counter-alarm) name character 2
…	…	…	…
0x000E	Channel 1 (input/counter-alarm) name character 15	0x000F	Channel 1 (input/counter-alarm) 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 (input/counter-alarm) name character 1	0x0015	Channel 2 (input/counter-alarm) name character 2
…	…	…	…
0x0022	Channel 2 (input/counter-alarm) name character 15	0x0023	Channel 2 (input/counter-alarm) 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 (input/counter-alarm) name character 1	0x008D	Channel 8 (input/counter-alarm) name character 2
…	…	…	…
0x009A	Channel 8 (input/counter-alarm) name character 15	0x009B	Channel 8 (input/counter-alarm) 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 (not used)	0x00A3	Led Intensity (not used)
0x00A4	Not used	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
0x00E8	Channel 1 (counter alarm output) name character 1	0x00E9	Channel 1 (counter alarm output) name character 2
…	…	…	…
0x00F6	Channel 1 (counter alarm output) name character 15	0x00F7	Channel 1 (counter alarm output) name character 16
…	…	…	…
0x02D8	Channel 32 (counter alarm output) name character 1	0x02D9	Channel 32 (counter alarm output) name character 2
…	…	…	…
0x02E6	Channel 32 (counter alarm output) name character 15	0x02E7	Channel 32 (counter alarm output) name character 16
0x02E8	Counter 1 pulses per unit low byte	0x02E9	Counter 1 pulses per unit high byte
0x02EA	Units	0x02EB	Not used

…	…	…	…
0x0304	Counter 8 pulses per unit low byte	0x0305	Counter 8 pulses per unit high byte
0x0306	Units	0x0307	Not used
0x0308	Counter alarm 1 conditions	0x0309	Assigned input counter for alarm 1
0x030A	Counter alarm 1 activation reaction time	0x030B	Counter alarm 1 de- activation reaction time
0x030C	Counter alarm 1 activation level byte 0 (LSB)	0x030D	Counter alarm 1 activation level byte 1
0x030E	Counter alarm 1 activation level byte 2	0x030E	Counter alarm 1 activation level byte 3 (MSB)
0x0310	Counter alarm 1 de-activation level byte 0 (LSB)	0x0311	Counter alarm 1 de-activation level byte 1
0x0312	Counter alarm 1 de-activation level byte 2	0x0313	Counter alarm 1 de-activation level byte 3 (MSB)
…	…	…	…
0x047C	Counter alarm 32 conditions	0x047D	Assigned input counter for alarm 32
0x047E	Counter alarm 32 activation reaction time	0x047F	Counter alarm 32 de- activation reaction time
0x0480	Counter alarm 32 activation level byte 0 (LSB)	0x0481	Counter alarm 32 activation level byte 1
0x0482	Counter alarm 32 activation level byte 2	0x0483	Counter alarm 32 activation level byte 3 (MSB)
0x0484	Counter alarm 32 de-activation level byte 0 (LSB)	0x0485	Counter alarm 32 de-activation level byte 1
0x0486	Counter alarm 32 de-activation level byte 2	0x0487	Counter alarm 32 de-activation level byte 3 (MSB)

Remark:
Unused locations contain 0xFF

Valid reaction times

Contents	Reaction time
0x01	Immediately (0.065s) (default)
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

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

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

Counter pulses per unit

Contents high byte	Contents low byte	Counter unit
B'00000000'	B'00000000'	Counter input disabled
B'00000000'	B'00000001'	1 pulse per unit (/kWh, /m^3 or /l)
B'00000000'	B'00000010'	2 pulses per unit (/kWh, /m^3 or /l)
…	…	…
B'11111111'	B'11111111'	65535 pulses per unit (/kWh, /m^3 or /l)

Counter units

Contents	Counter unit
0	reserved
1	liter
2	m^3
3	kWh (default)

Counter alarm conditons

Contents	Condition
B'xxxxxx00'	Counter value equal with activation level in Wh, l or ml
B'xxxxxx01'	Counter value equal with multiples of activation level in Wh, l or ml
B'xxxxxx10'	Power greater than or equal with activation level in W
B'xxxxxx11'	Power less than activation level in W
B'0xxxxxxx'	Alarm disabled
B'1xxxxxxx'	Alarm enabled

Remark:
The alarm modes 'counter value equal with' does not use the reaction times and de-activation level

Assigned counter channel

Contents	Assigned channel
0	Input counter 1
1	Input counter 2
…	…
7	Input counter 8

Alarm condition activation / de-activation reaction time

contents	Reaction time
0	0s
1	1s
2	2s
…	
59	59s
60	1min
61	1min1s
…	
…	
119	1min59s
120	2min
121	2min15s
…	
131	4min45s
132	5min
133	5min30s
…	
181	29min30s
182	30min
183	31min
…	
211	59min
212	1h

Address	Contents	Address	Contents
0x0488	Links in use byte 0 (LSB)	0x0489	Links in use high byte1
0x048A	Links in use low byte 2	0x048B	Links in use low byte 3 (MSB)
0x048C	Linked Push button 1 module address	0x048D	Linked Push button 1 bit number
0x048E	Linked Push button 1 action	0x048F	Linked Push button 1 parameter 1
0x0490	Linked Push button 1 parameter 2	…	…
…	…	…	…
…	…	0x0617	Linked Push button 80 module address
0x0618	Linked Push button 80 bit number	0x0619	Linked Push button 80 action
0x061A	Linked Push button 80 parameter 1	0x061B	Linked Push button 80 parameter 2

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

Action number	Action	Parameter 1	Parameter 2
1	Lock channel at closed/open switch	-	Channel 1…32
2	Lock channel	Timeout	Channel 1…32
3	Lock/unlock channel	Timeout	Channel 1…32
4	Unlock channel	-	Channel 1…32
5	Disable channel program at closed/open switch	-	Channel 1…32
6	Disable channel program channel	Timeout	Channel 1…32
7	Disable/enable channel program	Timeout	Channel 1…32
8	Enable channel program	-	Channel 1…32
9	Select no programs	-	-
10	Select program group 1	-	-
11	Toggle program group 1	-	-
12	Select program group 2	-	-
13	Toggle program group 2	-	-
14	Select program group 3	-	-
15	Toggle program group 3	-	-
16	Enable Alarm 1 at closed/open switch	-	-
17	Disable Alarm 1 at closed/open switch	-	-
18	Enable Alarm 1	-	-
19	Enable/Disable Alarm 1	-	-
20	Disable Alarm 1	-	-
21	Enable Alarm 2 at closed/open switch	-	-
22	Disable Alarm 2 at closed/open switch	-	-
23	Enable Alarm 2	-	-
24	Enable/Disable Alarm 2	-	-
25	Disable Alarm 2	-	-
26	Enable Sunrise at closed/open switch	-	-
27	Disable Sunrise at closed/open switch	-	-
28	Enable Sunrise	-	-
29	Enable/Disable Sunrise	-	-
30	Disable Sunrise	-	-
31	Enable Sunset at closed/open switch	-	-
32	Disable Sunset at closed/open switch	-	-
33	Enable Sunset	-	-
34	Enable/Disable Sunset	-	-
35	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
0x061C		Program steps used byte 0 (LSB)	0x061D		Program steps used byte 1
0x061E		Program steps used byte 2	0x061F		Program steps used byte 3 (MSB)
0x0620		Program step 1 byte1	0x0621		Program step 1 byte2
0x0622		Program step 1 byte3	0x0623		Program step 1 byte4
0x0624		Program step 1 byte5	0x0625		Program step 1 byte6
…		..	..		..
0x07B2		Program step 68 byte1	0x07B3		Program step 68 byte2
0x07B4		Program step 68 byte3	0x07B5		Program step 68 byte4
0x07B6		Program step 68 byte5	0x07B7		Program step 68 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 (only for input channels)
1	1s Pulse (only for input channels)
2	2s Pulse (only for input channels)
…	…
119	1min59s Pulse (only for input channels)
120	2min Pulse (only for input channels)
121	2min15s Pulse (only for input channels)
…	…
131	4min45s Pulse (only for input channels)
132	5min Pulse (only for input channels)
133	5min30s Pulse (only for input channels)
…	…
181	29min30s Pulse (only for input channels)
182	30min Pulse (only for input channels)
183	31min Pulse (only for input channels)
…	…
211	59min Pulse (only for input channels)
212	1h Pulse (only for input channels)
213	1h15min Pulse (only for input channels)
…	…
227	4h45min Pulse (only for input channels)
228	5h Pulse (only for input channels)
229	5h30min Pulse (only for input channels)
…	…
237	9h30min Pulse (only for input channels)
238	10h Pulse (only for input channels)
239	11h Pulse (only for input channels)
…	…
246	18h Pulse (only for input channels)
247	Press (only for input channels)
248	Long Press (only for input channels)
249	Release (only for input channels)
250	Lock
251	Unlock
252	No action
…	…
255	No action

Contents program byte6	Channel
1	Channel 1
2	Channel 2
…	…
32	Channel 32

Address	Contents	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