VMBPIRO-20

Outdoor PIR detector 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:
- Channel status
- Module status
- Module type
- Bus error counter status
- 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
- Temperature sensor temperature
- Temperature sensor name
- Temperature sensor setting

The module can receive the following commands:
- Linked push button status
- Module type request
- Module status request
- Light value request
- Set or clear test mode
- 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
- Temperature sensor name request
- Temperature sensor settings request
- Set temperature sensor zone number
- Set temperature calibration offset
- Set temperature calibration gain
- Set low temperature alarm
- Set high temperature alarm
- Reset minimum/maximum temperature

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

Contents	Channel number
B'00000001'	Dark output
B'00000010'	Light output
B'00000100'	Motion 1 output
B'00001000'	Light depending motion 1 output
B'00010000'	Motion 2 output
B'00100000'	Light depending motion 2 output
B'01000000'	Low temperature alarm
B'10000000'	High temperature alarm

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 = VMBPIRO-20 type (0x59)
    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 = 8 data bytes to send
    DATABYTE1 = COMMAND_MODULE_STATUS (0xED)
    DATABYTE2 = channel status (1 = pressed / 0 = released)

Contents	Channel status
B'xxxxxxx0'	Dark output off
B'xxxxxxx1'	Dark output on
B'xxxxxx0x'	Light output off
B'xxxxxx1x'	Light output on
B'xxxxx0xx'	Motion 1 output off
B'xxxxx1xx'	Motion 1 output on
B'xxxx0xxx'	Light depending motion 1 output off
B'xxxx1xxx'	Light depending motion 1 output on
B'xxx0xxxx'	Motion 2 output off
B'xxx1xxxx'	Motion 2 output on
B'xx0xxxxx'	Light depending motion 2 output off
B'xx1xxxxx'	Light depending motion 2 output on
B'x0xxxxxx'	Low temperature alarm off
B'x1xxxxxx'	Low temperature alarm on
B'0xxxxxxx'	High temperature alarm off

B'1xxxxxxx'	High temperature alarm on

DATABYTE3 = light sensor value high byte

DATABYTE4 = light sensor value low byte

DATABYTE5 = test modus or locked channel status (0 = unlocked / 1 = locked)

Contents	Test modus or locked status
B'00xxxxx0'	Dark output unlocked
B'00xxxxx1'	Dark output locked
B'00xxxx0x'	Light output unlocked
B'00xxxx1x'	Light output locked
B'00xxx0xx'	Motion 1 output unlocked
B'00xxx1xx'	Motion 1 output locked
B'00xx0xxx'	Light depending motion 1 output unlocked
B'00xx1xxx'	Light depending motion 1 output locked
B'00x0xxxx'	Motion 2 output unlocked
B'00x1xxxx'	Motion 2 output locked
B'000xxxxx'	Light depending motion 2 output unlocked
B'001xxxxx'	Light depending motion 2 output locked
B'10xxxxxx'	Test modus

DATABYTE6 = disabled channel program status (0 = program enabled / 1 = program disabled)

Contents	Program disabled status
B'00xxxxx0'	Dark output program enabled
B'00xxxxx1'	Dark output program disabled
B'00xxxx0x'	Light output program enabled
B'00xxxx1x'	Light output 1 program disabled
B'00xxx0xx'	Motion 1 output program enabled
B'00xxx1xx'	Motion 1 output program disabled
B'00xx0xxx'	Light depending motion 1 output program enabled
B'00xx1xxx'	Light depending motion 1 output program disabled
B'00x0xxxx'	Motion 2 output program enabled
B'00x1xxxx'	Motion 2 output 1 program disabled
B'000xxxxx'	Light depending motion 2 output program enabled
B'001xxxxx'	Light depending motion 2 output program disabled

DATABYTE7 = alarm & program selection

Contents	Selected programl
B'xxxxxx00'	None
B'xxxxxx01'	Summer
B'xxxxxx10'	Winter
B'xxxxxx11'	Holiday
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

DATABYTE8 = light value auto send interval time

     (Valid range: 10…255s)

     (5…9 = auto send on light value change with min interval 5…9s)

     (<5 = auto send disabled)

Transmit the light raw value:
    SID10-SID9 = 11 (lowest priority)
    SID8...SID1 = Module address
    RTR = 0
    DLC3...DLC0 = 3 data bytes to send
    DATABYTE1 = COMMAND_SENSOR_RAW_DATA (0xA9)
    DATABYTE4 = High byte current light value
    DATABYTE5 = Low byte current light value

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 (0x03FF – memory block length)

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 the sensor temperature:
    SID10-SID9 = 11 (lowest priority)
    SID8...SID1 = Module address
    RTR = 0
    DLC3...DLC0 = 7 data bytes to send
    DATABYTE1 = COMMAND_SENSOR_TEMPERATURE (0xE6)
    DATABYTE2 = High byte current sensor temperature
    DATABYTE3 = Low byte current sensor temperature into two's complement format (resolution 0.0625°)
    DATABYTE4 = High byte minimum sensor temperature
    DATABYTE5 = Low byte minimum sensor temperature into two's complement format (resolution 0.0625°)
    DATABYTE6 = High byte maximum sensor temperature
    DATABYTE7 = Low byte maximum sensor temperature into two's complement format (resolution 0.0625°)

High byte	Low byte	Current sensor temperature
01111111	11100000	63.5°C
00000000	00100000	0.0625°C
00000000	00000000	0°C
11111111	11100000	-0.0625°C
10010010	00000000	-55°C

Transmits the first part of the temperature sensor name:
    SID10-SID9 = 11 (lowest priority)
    SID8...SID1 = Module address
    RTR = 0
    DLC3...DLC0 = 8 data bytes to send
    DATABYTE1 = COMMAND_SENSOR_NAME_PART1 (0xF0)
    DATABYTE2 = Channel number (9 = Temperature Sensor)
    DATABYTE3 = Character 1 of the sensor name
    DATABYTE4 = Character 2 of the sensor name
    DATABYTE5 = Character 3 of the sensor name
    DATABYTE6 = Character 4 of the sensor name
    DATABYTE7 = Character 5 of the sensor name
    DATABYTE8 = Character 6 of the sensor name

Transmits the second part of the temperature sensor name:
    SID10-SID9 = 11 (lowest priority)
    SID8...SID1 = Module address
    RTR = 0
    DLC3...DLC0 = 8 data bytes to send
    DATABYTE1 = COMMAND_SENSOR_NAME_PART2 (0xF1)
    DATABYTE2 = Channel number (9 = Temperature Sensor)
    DATABYTE3 = Character 7 of the sensor name
    DATABYTE4 = Character 8 of the sensor name
    DATABYTE5 = Character 9 of the sensor name
    DATABYTE6 = Character 10 of the sensor name
    DATABYTE7 = Character 11 of the sensor name
    DATABYTE8 = Character 12 of the sensor name

Transmits the third part of the temperature sensor name:
    SID10-SID9 = 11 (lowest priority)
    SID8...SID1 = Module address
    RTR = 0
    DLC3...DLC0 = 6 data bytes to send
    DATABYTE1 = COMMAND_SENSOR_NAME_PART3 (0xF2)
    DATABYTE2 = Channel number (9 = Temperature Sensor)
    DATABYTE3 = Character 13 of the sensor name
    DATABYTE4 = Character 14 of the sensor name
    DATABYTE5 = Character 15 of the sensor name
    DATABYTE6 = Character 16 of the sensor name

    Remarks:
    Unused characters contain 0xFF.

Transmit the first part of the sensor settings:
    SID10-SID9 = 11 (lowest priority)
    SID8...SID1 = Module address
    RTR = 0
    DLC3...DLC0 = 8 data bytes to send
    DATABYTE1 = COMMAND_TEMP_SENSOR_SETTINGS_PART1 (0xE8)
    DATABYTE2 = Current temperature set (resolution 0.5°)
    DATABYTE3 = Comfort temperature set for heating mode (resolution 0.5°)
    DATABYTE4 = Day temperature set for heating mode (resolution 0.5°)
    DATABYTE5 = Night temperature set for heating mode (resolution 0.5°)
    DATABYTE6 = Anti frost temperature set for heating mode (resolution 0.5°)
    DATABYTE7 = Boost temperature difference set (resolution 0.5°)
    DATABYTE8 = Hysteresis temperature set

Contents	Hysteresis
xxx11111	15.5°C
Xxx00001	0.5°C
Xxx00000	0°C

Transmit the second part of the sensor settings:
    SID10-SID9 = 11 (lowest priority)
    SID8...SID1 = Module address
    RTR = 0
    DLC3...DLC0 = 8 data bytes to send
    DATABYTE1 = COMMAND_TEMP_SENSOR_SETTINGS_PART2 (0xE9)
    DATABYTE2 = Comfort temperature set for cooling mode (resolution 0.5°)
    DATABYTE3 = Day temperature set for cooling mode (resolution 0.5°)
    DATABYTE4 = Night temperature set for cooling mode (resolution 0.5°)
    DATABYTE5 = Safe temperature set for cooling mode (resolution 0.5°)
    DATABYTE6 = High byte of the default sleep timer
    DATABYTE7 = Low byte of the default sleep timer into minutes (1 to 65.279min)
    DATABYTE8 = Default auto send temperature time interval into seconds
                (Valid range: 10…255s)
                (5…9 = auto send on temperature change with min interval 5…9s)
                (<4 = auto send disabled)

Transmit the third part of the sensor settings:
    SID10-SID9 = 11 (lowest priority)
    SID8...SID1 = Module address
    RTR = 0
    DLC3...DLC0 = 8 data bytes to send
    DATABYTE1 = COMMAND_TEMP_SENSOR_SETTINGS_PART3 (0xC6)
    DATABYTE2 = Temperature alarm 1 setting (resolution 0.5°)
    DATABYTE3 = Temperature alarm 4 setting (resolution 0.5°)
    DATABYTE4 = Lower temperature range cool mode (resolution 0.5°)
    DATABYTE5 = Upper temperature range heat mode (resolution 0.5°)
    DATABYTE6 = Calibration offset factor (resolution 0.5°)

Contents	Calibration factor
00001111	Calibration factor +7.5°C
00000001	Calibration factor +0.5°C
00000000	Calibration factor +0°C
11111111	Calibration factor -0.5°C
11110000	Calibration factor -8°C

    DATABYTE7 = Zone number
    DATABYTE8 = Calibration gain factor

Transmit the fourth part of the sensor settings:
    SID10-SID9 = 11 (lowest priority)
    SID8...SID1 = Module address
    RTR = 0
    DLC3...DLC0 = 8 data bytes to send
    DATABYTE1 = COMMAND_TEMP_SENSOR_SETTINGS_PART4 (0xB9)

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…66 / 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	Lock
1	Unlock

DATABYTE8 = Channel number

Contents	Channel
1	Dark channel
2	Light channel
3	Motion 1 channel
4	Light depending motion 1 channel
5	Motion 2 channel
6	Light depending motion 2 channel

'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 (H'D7')

'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

'Light value request' command received:
    SID10-SID9 = 11 (lowest priority)
    SID8...SID1 = Module address
    RTR = 0
    DLC3...DLC0 = 2 data bytes to send
    DATABYTE1 = COMMAND_LIGHT_VALUE_REQUEST (0xAA)
    DATABYTE2 = Auto send interval time into seconds
                   (valid range: 10…255s)
                   (5…9 = auto send on change)
                   (1…4 = auto send disabled)
                   (0 = no change on auto send interval time)

'Set or Clear test mode' command received:
    SID10-SID9 = 11 (lowest priority)
    SID8...SID1 = Module address
    RTR = 0
    DLC3...DLC0 = 2 data bytes received
    DATABYTE1 = COMMAND_SET_CLR_LEARN_MODE (0xB5)
    DATABYTE2 = Operating mode

Contents	Operating mode
0	Normal
1	Test mode

Remark:
After changing the operating mode, the module sends his status.
There is a timeout of 30 minutes for the test mode.

'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 received / 4 data bytes for CAN FD response
    DATABYTE1 = COMMAND_READ_MEMORY_BLOCK (0xC9)
    DATABYTE2 = High memory address
    DATABYTE3 = LOW memory address

    Remark:
    address range: 0x0000 to 0x03FC
    address range: 0x0000 to (0x03FF – 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
    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 (0x03FF – 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…6

Contents	Channel
1	Dark channel
2	Light channel
3	Motion 1 channel
4	Light depending motion 1 channel
5	Motion 2 channel
6	Light depending motion 2 channel

'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…7

Contents	Channel
1	Dark channel
2	Light channel
3	Motion 1 channel
4	Light depending motion 1 channel
5	Motion 2 channel
6	Light depending motion 2 channel

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…6

Contents	Channel
1	Dark channel
2	Light channel
3	Motion 1 channel
4	Light depending motion 1 channel
5	Motion 2 channel
6	Light depending motion 2 channel

'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

Contents	Channel
1	Dark channel
2	Light channel
3	Motion 1 channel
4	Light depending motion 1 channel
5	Motion 2 channel
6	Light depending motion 2 channel

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 H'FFFFFF' 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 (Summer)
2	Program group 2 (Winter)
3	Program group 3 (Holiday)

'Temperature sensor 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 9 or 0xFF

'Temperature request' command received:
SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 2 data bytes to send
DATABYTE1 = COMMAND_SENSOR_TEMP_REQUEST (0xE5)
DATABYTE2 = Auto send time interval into seconds
    (valid range: 10…255s)
    (5…9 = auto send on temperature change)
    (1…4 = auto send disabled)
    (0 = no change on auto send interval)

'Temperature sensor settings request' command received:
SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 2 data bytes to send
DATABYTE1 = COMMAND_TEMP_SENSOR_SETTINGS_REQUEST (0xE7)
DATABYTE2 = don't care

'Set temperature sensor zone number' command received:
    SID10-SID9 = 11 (lowest priority)
    SID8...SID1 = Module address
    RTR = 0
    DLC3...DLC0 = 2 data bytes to send
    DATABYTE1 = COMMAND_SET_SENSOR_ZONE_NUMBER (0xC5)
    DATABYTE2 = Zone number (0= no zone)

'Set temperature' command received:

    SID10-SID9 = 11 (lowest priority)

    SID8...SID1 = Module address

    RTR = 0

    DLC3...DLC0 = 3 data bytes received

    DATABYTE1 = COMMAND_SET_TEMP (0xE4)

    DATABYTE2 = Pointer to temperature variable (0…20)

Contents	Temperature variable
11	Calibration offset (-8°…+7.5°C)
12	Reset minimum/maximum temperature
15	Low temperature alarm set
16	High temperature alarm set
28	Calibration gain factor

    DATABYTE3 = calibration offset (resolution 0.5°)

Contents	Callibration offset
00001111	+7.5°C
00000001	+0.5°C
00000000	0°C
11111111	-0.5°C
11110000	-8°C

    DATABYTE3 = Alarm temperature set (resolution 0.5°)

Contents	Temperature set
01111000	60°C
00000010	1°C
00000001	0.5°C
00000000	0°C
11111111	-0.5°C
11000000	-32°C

    DATABYTE3 = Reset minimum/maximum temperature

Contents	Reset temperature
00000001	Reset minimum temperature
00000010	Reset maximum temperature

    Remark:

    Wait at least 10ms for sending a next command on the velbus.

'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…66)

    DATABYTE3 = Program group number (1…3)

    DATABYTE4 = Channel number

Contents	Channel
1	Dark output
2	Light output
3	Motion 1 output
4	Light depending motion 1 output
5	Motion 2 output
6	Light depending motion 2 output

    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…66)
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	Lock
1	Unlock

DATABYTE8 = Channel number 1…7

Contents	Channel
1	Dark channel
2	Light channel
3	Motion 1 channel
4	Light depending motion 1 channel
5	Motion 2 channel
6	Light depending motion 2 channel

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

Memory map version 1:

0x0000	Dark value low byte	0x0001	Dark value high byte
0x0002	Light value low byte	0x0003	Light value high byte
0x0004	Light to dark reaction time (default 1min)	0x0005	Dark timer mode = non restartable timer
0x0006	Dark timeout (default momentary)	0x0007	Dark flags (default cycling protect off & external overwrite off)
0x0008	Dark to light reaction time (default 1min)	0x0009	Light timer mode = non restartable timer
0x000A	Light timeout (default momentary)	0x000B	Light flags cycling protect = off (default external overwrite off)
0x000C	Motion 1 reaction time = 0 sec (fixed)	0x000D	Motion 1 timer mode = restartable timer (fixed)
0x000E	Motion 1 timeout (default 2 min)	0x000F	Motion 1 flags: Bit 0: cycling protect Bit 1: external overwrite restartable timer (default off)
0x0010	Dark value low byte for light depending motion 1	0x0011	Dark value high byte for light depending motion 1
0x0012	Light value low byte for light depending motion 1 (0.98*motion 1 dark value)	0x0013	light value high byte for light depending motion 1
0x0014	Dark reaction time for light depending motion 1 = 0 sec (fixed)	0x0015	Dark timer mode for light depending motion 1 = non restartable timer (fixed)
0x0016	Dark timeout for light depending motion 1 = momentary (fixed)	0x0017	Dark flags for light depending motion 1: Bit 0: cycling protect = off (fixed) Bit 1: external overwrite off (fixed)
0x0018	Light depending motion 1 reaction time = 0 sec (fixed)	0x0019	Light depending motion 1 timer mode = restartable timer (fixed)
0x001A	Light depending motion 1 timeout (default 2 min)	0x001B	Light depending motion 1 flags: Bit 0: cycling protect Bit 1: external overwrite (default off)
0x001C	Motion 2 reaction time = 0 sec (fixed)	0x001D	Motion 2 timer mode = restartable timer (fixed)
0x001E	Motion 2 timeout (default 2 min)	0x001F	Motion 2 flags: Bit 0: cycling protect Bit 1: external overwrite restartable timer (default off)
0x0020	Dark value low byte for light depending motion 2	0x0021	Dark value high byte for light depending motion 2
0x0022	Light value low byte for light depending motion 2 (0.98*motion 1 dark value)	0x0023	light value high byte for light depending motion 2
0x0024	Dark reaction time for light depending motion 2 = 0 sec (fixed)	0x0025	Dark timer mode for light depending motion 2 = non restartable timer (fixed)
0x0026	Dark timeout for light depending motion 2 = momentary (fixed)	0x0027	Dark flags for light depending motion 2: Bit 0: cycling protect = off (fixed) Bit 1: external overwrite off (fixed)
0x0028	Light depending motion 2 reaction time = 0 sec (fixed)	0x0029	Light depending motion 2 timer mode = restartable timer (fixed)
0x002A	Light depending motion 2 timeout (default 2 min)	0x002B	Light depending motion 2 flags: Bit 0: cycling protect Bit 1: external overwrite (default off)
0x002C	*Absence timeout*	0x002D	*Absence output mode*
0x002E	Not used	0x002F	Not used
0x0030	Not used	0x0031	Not used
0x0032	Not used	0x0033	Alarm clock configuration
0x0034	Wake up 1 hour (0…23)	0x0035	Wake up 1 minutes (0…59)
0x0036	Go to bed 1 hour (0…23)	0x0037	Go to bed 1 minutes (0…59)
0x0038	Wake up 2 hour (0…23)	0x0039	Wake up 2 minutes (0…59)
0x003A	Go to bed 2 hour (0…23)	0x003B	Go to bed 2 minutes (0…59)
0x003C	Sunrise hour at 21 December (0…23)	0x003D	Sunrise minutes at 21 December (0…59)
0x003E	Sunrise 21 January – sunrise 5 January (-128'..127')	0x003F	Sunrise 5 February – sunrise 21 January (-128'..127')
0x0040	Sunrise 21 February – sunrise 5 February (-128'..127')	0x0041	Sunrise 5 March – sunrise 21 February (-128'..127')
0x0042	Sunrise 21 March – sunrise 5 March (-128'..127')	0x0043	Sunrise 5 April – sunrise 21 March (-128'..127')
0x0044	Sunrise 21 April – sunrise 5 April (-128'..127')	0x0045	Sunrise 5 May – sunrise 21 April (-128'..127')
0x0046	Sunrise 21 May – sunrise 5 May (-128'..127')	0x0047	Sunrise 5 June – sunrise 21 May (-128'..127')
0x0048	Sunrise 21 June – sunrise 5 June (-128'..127')	0x0049	Sunrise 5 July – sunrise 21 June (-128'..127')
0x004A	Sunrise 21 July – sunrise 5 July (-128'..127')	0x004B	Sunrise 5 August – sunrise 21 July (-128'..127')
0x004C	Sunrise 21 August – sunrise 5 August (-128'..127')	0x004D	Sunrise 5 September – sunrise 21 August (-128'..127')
0x004E	Sunrise 21 September – sunrise 5 September (-128..127')	0x004F	Sunrise 5 October – sunrise 21 September (-128'..127')
0x0050	Sunrise 21 October – sunrise 5 October (-128'..127')	0x0051	Sunrise 5 November – sunrise 21 October (-128'..127')
0x0052	Sunrise 21 November – sunrise 5 November (-128'..127')	0x0053	Sunrise 5 December – sunrise 21 November (-128'..127')
0x0054	Sunrise 21 December – sunrise 5 December (-128'..127')	0x0055	Sunrise 5 January – sunrise 21 December (-128'..127')
0x0056	Not used	0x0057	Not used
0x0058	Sunset hour at 21 December (0…23)	0x0059	Sunset minutes at 21 December (0…59)
0x005A	Sunset 21 January – sunrise 5 January (-128'..127')	0x005B	Sunset 5 February – sunrise 21 January (-128'..127')
0x005C	Sunset 21 February – sunrise 5 February (-128'..127')	0x005D	Sunset 5 March – sunrise 21 February (-128'..127')

0x005E	Sunset 21 March – sunrise 5 March (-128'..127')	0x005F	Sunset 5 April – sunrise 21 March (-128'..127')
0x0060	Sunset 21 April – sunrise 5 April (-128'..127')	0x0061	Sunset 5 May – sunrise 21 April (-128'..127')
0x0062	Sunset 21 May – sunrise 5 May (-128'..127')	0x0063	Sunset 5 June – sunrise 21 May (-128'..127')
0x0064	Sunset 21 June – sunrise 5 June (-128'..127')	0x0065	Sunset 5 July – sunrise 21 June (-128'..127')
0x0066	Sunset 21 July – sunrise 5 July (-128'..127')	0x0067	Sunset 5 August – sunrise 21 July (-128'..127')
0x0068	Sunset 21 August – sunrise 5 August (-128'..127')	0x0069	Sunset 5 September – sunrise 21 August (-128'..127')
0x006A	Sunset 21 September – sunrise 5 September (-128'..127')	0x006B	Sunset 5 October – sunrise 21 September (-128'..127')
0x006C	Sunset 21 October – sunrise 5 October (-128'..127')	0x006D	Sunset 5 November – sunrise 21 October (-128'..127')
0x006E	Sunset 21 November – sunrise 5 November (-128'..127')	0x006F	Sunset 5 December – sunrise 21 November (-128'..127')
0x0070	Sunset 21 December – sunrise 5 December (-128'..127')	0x0071	Sunset 5 January – sunrise 21 December (-128'..127')
0x0072	Not used	0x0073	Not used
0x0074	Sensor name character 1	0x0075	Sensor name character 2
...	...	...	...
0x0082	Sensor name character 15	0x0083	Sensor name character 16
0x0084	Temp. sensor: zone	0x0085	Temp. sensor: calibration offset
0x0086	Temp. sensor: calibration gain	0x0087	*Temp. sensor: hysteresis*
0x0088	*Temp. sensor: boost difference*	0x0089	*Temp. sensor: Pump delayed on*
0x008A	*Temp. sensor: pump delayed off*	0x008B	*Temp. sensor: min switching time*
0x008C	*Temp. sensor: default sleep time byte 0 (low)*	0x008D	*Temp. sensor: default sleep time byte 1 (high)*
0x008E	*Temp. sensor: default sleep time byte 2*	0x008F	*Temp. sensor: default sleep time byte 3 (msb)*
0x0090	*Temp. sensor: heater lower temperature range low byte*	0x0091	*Temp. sensor: heater lower temperature range high byte*
0x0092	*Temp. sensor: heater upper temperature range low byte*	0x0093	*Temp. sensor: heater lower temperature range high byte*
0x0094	*Temp. sensor: heater safe temperature set*	0x0095	*Temp. sensor: heater night temperature set*
0x0096	*Temp. sensor: heater day temperature set*	0x0097	*Temp. sensor: heater comfort temperature set*
0x0098	*Temp. sensor: cooler lower temperature range low byte*	0x0099	*Temp. sensor: cooler upper temp. range high byte*
0x009A	*Temp. sensor: cooler upper temperature range low byte*	0x009B	*Temp. sensor: cooler upper temp. range high byte*
0x009C	*Temp. sensor: cooler safe temperature set*	0x009D	*Temp. sensor: cooler night temperature set*
0x009E	*Temp. sensor: cooler day temperature set*	0x009F	*Temp. sensor: cooler comfort temperature set*
0x00A0	Temp. sensor: alarm 1 temperature set (low alarm)	0x00A1	*Temp. sensor: alarm 2 temperature set*
0x00A2	*Temp. sensor: alarm 3 temperature set*	0x00A3	Temp. sensor: alarm 4 temperature set (high alarm)
0x00A4	Temp. sensor settings	0x00A5	Temp. sensor alarm 1 & 2 settings
0x00A6	Temp. sensor alarm 3 & 4 settings	0x00A7	Not used

Remark:
Unused locations contain H'FF'

Reaction time (light to dark, dark to light, motion & light depending motion)

contents	Reaction time
0	0s
1	1s (factory default for motion & light depending motion)
2	2s
...	
59	59s
60	1min (factory default for light to dark & dark to light)
61	1min1s
...	
…	
119	1min59s
120	2min
121	2min15s
...	
131	4min45s
132	5min
133	5min30s
...	
181	29min30s
182	30min
183	31min
...	
211	59min
212	1h

Timer mode (dark, light, motion & light depending motion)

Contents	Timer mode
0x00	non restartable timer (for dark & light)
0xFF	restartable timer (for motion & light depending motion)

Timeout (light to dark, dark to light, motion & light depending motion)

Contents	Timeout
0	0 = momentary (factory default for dark, light & motion)
1	1s
2	2s
...	
119	1min59s
120	2min (factory default for light depending motion)
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

Dark flags

Contents	Timer mode
B'xxxxxxx0'	Cycling protection disabled (default)
B'xxxxxxx1'	Cycling protection enabled
B'xxxxxx0x'	External overwrite disabled (default)
B'xxxxxx1x'	External overwrite enabled

Light flags

Contents	Timer mode
B'xxxxxxx0'	Cycling protection disabled (default)
B'xxxxxxx1'	Cycling protection enabled
B'xxxxxx0x'	External overwrite disabled (default)
B'xxxxxx1x'	External overwrite enabled

Motion flags

Contents	Timer mode
B'xxxxxxx0'	Cycling protection disabled -> time-out interruptable
B'xxxxxxx1'	Cycling protection enabled -> time-out not interruptable
B'xxxxxx0x'	External overwrite disabled (default)
B'xxxxxx1x'	External overwrite enabled

Light depending motion flags

Contents	Timer mode
B'xxxxxxx0'	Cycling protection disabled -> time-out interruptable
B'xxxxxxx1'	Cycling protection enabled -> time-out not interruptable
B'xxxxxx0x'	External overwrite disabled (default)
B'xxxxxx1x'	External overwrite enabled

Absence timeout

Time parameter	Timeout
60	1min
61	1min1s
62	1min2s
...	
119	1min59s
120	2min
121	2min15s
...	
131	4min45s
132	5min
133	5min30s
...	
152	15min (default)
...	
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

Absence output mode

Contents	Absence output mode
0x00	Momentary (default)
0xFF	1 second pulse

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

Temp. sensor zone

Contents	Zone
0'	No zone
1.	Zone 1...
...	...
7	Zone 7

Temperature sensor flags

Contents	Description
B'xxxxxxx0'	Pump unjamming disabled (default)
B'xxxxxxx1'	Pump unjamming enabled
B'xxxxxx0x'	Heater valve unjamming disabled (default)
B'xxxxxx1x'	Heater valve unjamming enabled
B'xxxxx0xx'	Independent temperature alarms (default)
B'xxxxx1xx'	Dependent temperature alarms

Temperature sensor calibration offset (resolution 0.5°):

Contents	Calibration offset
00001111	Calibration offset +7.5°C
…	…
00000001	Calibration offset +0.5°C
00000000	Calibration offset +0°C (default)
11111111	Calibration offset -0.5°C
…	…
11110000	Calibration offset -8°C

Temperature sensor calibration gain:

Contents	Calibration gain
0	Calibration gain
…	…
128	Calibration gain (default)
…	…
255	Calibration gain

Calibrated Temperature = (gain/128) * sensortemperature + offset

Temperature sensor hysteresis (resolution 0.5°):

Contents	Hysteresis
00011111	15.5°C
00000001	0.5°C (default)
00000000	0°C

Temperature sensor boost difference (resolution 0.5°):

Contents	Temperature difference
00010100	+10°C
00000001	+0.5°C
00000000	0°C
11111111	-0.5°C
11101100	-10°C

Temperature sensor pump delayed on, pump delayed off & valve minimum switching time:

Contents	Time
00000000	0 (default)
00000001	1 sec
00000010	2 sec
…	…
11111110	254 sec
11111111	255 sec

Temperature sensor default sleep time into minutes
  valid range 0x0001 to 0xFEFF or 1min to 65.279min

Temperature sensor lower range, upper range, safe, night, day, comfort or alarm set (resolution 0.5°):

Contents	Temperature set
01111000	60°C
00101000	20°C
00000010	1°C
00000001	0.5°C
00000000	0°C
11111111	-0.5°C
11000000	-32°C

Temperature sensor Alarm1 & 2 modes

Contents	Description
B'xxxxx000'	Low temperature alarm 1 (default)
B'xxxxx001'	High temperature alarm 1
B'xxxxx010'	Anti-frost mode alarm 1
B'xxxxx011'	Night mode alarm 1
B'xxxxx100'	Day mode alarm 1
B'xxxxx101'	Comfort mode alarm 1
B'xxxxx110'	Night, Day or Comfort mode alarm 1
B'xxxxx111'	Day or Comfort mode alarm 1
B'xxxx0xxx'	Temperature alarms 1 absolute (default)
B'xxxx1xxx'	Temperature alarms 1 relative
B'x000xxxx'	Low temperature alarm 2
B'x001xxxx'	High temperature alarm 2 (default)
B'x010xxxx'	Anti-frost mode alarm 2
B'x011xxxx'	Night mode alarm 2
B'x100xxxx'	Day mode alarm 2
B'x101xxxx'	Comfort mode alarm 2
B'x110xxxx'	Night, Day or Comfort mode alarm 2
B'x111xxxx'	Day or Comfort mode alarm 2
B'0xxxxxxx'	Temperature alarms 2 absolute (default)
B'1xxxxxxx'	Temperature alarms 2 relative

Temperature sensor Alarm3 & 4 modes

Contents	Description
B'xxxxx000'	Low temperature alarm 3
B'xxxxx001'	High temperature alarm 3 (default)
B'xxxxx010'	Anti-frost mode alarm 3
B'xxxxx011'	Night mode alarm 3
B'xxxxx100'	Day mode alarm 3
B'xxxxx101'	Comfort mode alarm 3
B'xxxxx110'	Night, Day or Comfort mode alarm 3
B'xxxxx111'	Day or Comfort mode alarm 3
B'xxxx0xxx'	Temperature alarms 3 absolute (default)
B'xxxx1xxx'	Temperature alarms 3 relative
B'x000xxxx'	Low temperature alarm 4
B'x001xxxx'	High temperature alarm 4 (default)
B'x010xxxx'	Anti-frost mode alarm 4
B'x011xxxx'	Night mode alarm 4
B'x100xxxx'	Day mode alarm 4
B'x101xxxx'	Comfort mode alarm 4
B'x110xxxx'	Night, Day or Comfort mode alarm 4
B'x111xxxx'	Day or Comfort mode alarm 4
B'0xxxxxxx'	Temperature alarms 4 absolute (default)

B'1xxxxxxx'	Temperature alarms 4 relative

Address	Contents	Address	Contents
0x00A8	Links in use byte 0 (LSB)	0x00A9	Links in use high byte1
0x00AA	Links in use low byte 2	0x00AB	Links in use low byte 3 (MSB)
0x00AC	Linked Push button 1 module address	0x00AD	Linked Push button 1 bit number
0x00AE	Linked Push button 1 action	0x00AF	Linked Push button 1 time parameter
0x00B0	Linked Push button 1 channel parameter	...	…
...	...	...	...
0x0222	…	0x0223	Linked Push button 76 module address
0x0224	Linked Push button 76 bit number	0x0225	Linked Push button 76 action
0x0226	Linked Push button 76 time parameter	0x0227	Linked Push button 76 channel parameter

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	Time parameter	Channel number
0	No action	-	-
1	Lock channel at closed/open switch	-	-
2	Lock channel	Time-out	Channel 1…6
3	Lock/unlock channel	Time-out	Channel 1…6
4	Unlock channel	-	Channel 1…6
5	Disable channel program at closed/open switch	-	Channel 1…6
6	Disable channel program channel	Timeout	Channel 1…6
7	Disable/enable channel program	Timeout	Channel 1…6
8	Enable channel program	-	Channel 1…6
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	-	-

Channel number

Contents	Channel number
1	Dark output
2	Light output
3	Motion 1 output
4	Light depending motion 1 output
5	Motion 2 output
6	Light depending motion 2 output

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
0x0228	Program steps used byte 0 (LSB)	0x0229	Program steps used byte 1
0x022A	Program steps used byte 2	0x022B	Program steps used byte 3 (MSB)
0x022C	Program step 1 byte1	0x022D	Program step 1 byte2
0x022E	Program step 1 byte3	0x022F	Program step 1 byte4
0x0230	Program step 1 byte5	0x0231	Program step 1 byte6
…	…	…	…
0x03B2	Program step 66 byte 1	0x03B3	Program step 66 byte2
0x03B4	Program step 66 byte3	0x03B5	Program step 66 byte4
0x03B6	Program step 66 byte5	0x03B7	Program step 66 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'	Summer program
B'x1xxxxxx'	Winter program
B'1xxxxxxx'	Holiday program

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

	Contents program byte4		
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
250	Lock
251	Unlock

Contents program byte6	Channel
1	Dark output
2	Light output
3	Motion 1 output
4	Light depending motion 1 output
5	Motion 2 output
6	Light depending motion 2 output

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