

VMBLCDWB

**Multi page push button module
for VELBUS system**

Binary format:

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

<i>bits</i>	<i>Description</i>
SOF	Start Of Frame (always 0)
SID10 & SID9	Priority (00: highest ... 11: lowest priority)
SID8...SID1	Address
SID0	Always 0
RTR	Remote Transmit Request
IDE	Identifier Extension (always 0)
r0	reserved (always 0)
DLC3...DLC0	Data Length Code (0...8)
Databyte1	Command
Databyte2	Parameter
Databyte3	Parameter
Databyte4	Parameter
Databyte5	Parameter
Databyte6	Parameter
Databyte7	Parameter
Databyte8	Parameter
CRC15...CRC1	Cyclic Redundancy Checksum
CRCDEL	CRC Delimiter (always 1)
ACK	Acknowledge slot (transmit 1 readback 0 if received correctly)
ACKDEL	Acknowledge Delimiter (always 1)
EOF7...EOF1	End Of Frame (always 111111)
IFS3...IFS1	InterFrame Space (always 111)

The module can transmit the following messages:

- Channel status
- Module status
- Module type and subtype
- 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
- Set global clock alarm
- Clear linked push button led
- Set linked push button led
- Slow blink linked push button led
- Fast blink linked push button led

The module can receive the following commands:

- 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)
- Lcd page text request
- 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

Transmits real time clock status request:

SID10-SID9 = 11 (lowest priority)

SID8...SID1 = H'00'

RTR = 0

DLC3...DLC0 = 1 databyte to send

DATABYTE1 = COMMAND_REALTIME_CLOCK_STATUS_REQUEST (H'D7')

Transmits the real time clock status:

SID10-SID9 = 11 (lowest priority)

SID8...SID1 = H'00'

RTR = 0

DLC3...DLC0 = 4 databytes to send

DATABYTE1 = COMMAND_REALTIME_CLOCK_STATUS (H'D8')

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)

Remark: The real time clock status will only be send if master clock is on

Transmits the date status:

SID10-SID9 = 11 (lowest priority)

SID8...SID1 = H'00'

RTR = 0

DLC3...DLC0 = 5 databytes to send

DATABYTE1 = COMMAND_DATE_STATUS (H'B7')

DATABYTE2 = Day (1...31)

DATABYTE3 = Month (1...12)

DATABYTE4 = High byte of Year

DATABYTE5 = Low byte of Year

Remark: The date status will only be send if master clock is on

Transmits the daylight savings status:

SID10-SID9 = 11 (lowest priority)

SID8...SID1 = H'00'

RTR = 0

DLC3...DLC0 = 2 databytes to send

DATABYTE1 = COMMAND_DAYLIGHT_SAVING_STATUS (H'AF')

DATABYTE2 = 0 =disabled / 1 = enabled

Remark: The daylight savings status will only be send if master clock is on

Transmit 'set global clock alarm':

SID10-SID9 = 11 (lowest priority)

SID8...SID1 = H'00'

RTR = 0

DLC3...DLC0 = 7 databytes to send

DATABYTE1 = COMMAND_SET_ALARM_CLOCK (H'C3')

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)

Transmits the channel switch status:

SID10-SID9 = 00 (highest priority)
SID8...SID1 = Module address, subaddress1, subaddress2 or subaddress3
RTR = 0
DLC3...DLC0 = 4 databytes to send
DATABYTE1 = COMMAND_PUSH_BUTTON_STATUS (H'00')
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 = 7 databytes to send
DATABYTE1 = COMMAND_MODULE_TYPE (H'FF')
DATABYTE2 = VMBLCDWB type (H'13')
DATABYTE3 = High byte of serial number
DATABYTE4 = Low byte of serial number
DATABYTE5 = Memorymap version
DATABYTE6 = Build year
DATABYTE7 = Build week

Transmits the module subtype:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 8 databytes to send
DATABYTE1 = COMMAND_SUBTYPE (H'B0')
DATABYTE2 = VMBLCDWB type (H'13')
DATABYTE3 = High byte of serial number
DATABYTE4 = Low byte of serial number
DATABYTE5 = Subaddress1 (H'FF' subaddress disabled)
DATABYTE6 = Subaddress2 (H'FF' subaddress disabled)
DATABYTE7 = Subaddress3 (H'FF' subaddress disabled)
DATABYTE8 = Subaddress4 (H'FF' subaddress disabled)

Transmit: Bus error counter status

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 4 databytes to send
DATABYTE1 = COMMAND_BUSERROR_COUNTER_STATUS (H'DA')
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 databytes to send
DATABYTE1 = COMMAND_MEMORY_DATA (H'FE')
DATABYTE2 = High memory address
DATABYTE3 = LOW memory address
DATABYTE4 = memory data

Remark: address range: H'0000' to H'09FF'

Transmits memory data block (4 bytes):

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 7 databytes to send
DATABYTE1 = COMMAND_MEMORY_DATA_BLOCK (H'CC')
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: H'0000' to H'09FC'

Transmits the first part of channel name:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 8 databytes to send
DATABYTE1 = COMMAND_CHANNEL_NAME_PART1 (H'F0')
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 databytes to send
DATABYTE1 = COMMAND_CHANNEL_NAME_PART2 (H'F1')
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 databytes to send
DATABYTE1 = COMMAND_CHANNEL_NAME_PART3 (H'F2')
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 H'FF'.

Transmits the module status:

SID10-SID9 = 11 (lowest priority)

SID8...SID1 = Module address, subaddress1, subaddress2 or subaddress3

RTR = 0

DLC3...DLC0 = 7 databytes to send

DATABYTE1 = COMMAND_MODULE_STATUS (H'ED')

DATABYTE2 = channel 1 to 8 status (1 = pressed / 0 = released)

DATABYTE3 = enabled/disable channel status (1 = enabled / 0 = disabled)

DATABYTE4 = normal/inverted channel status (1 = normal / 0 = inverted)

DATABYTE5 = locked channel status (0 = unlocked / 1 = locked)

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

DATABYTE7 = alarm & program selection

<i>Contents</i>	<i>Selected program1</i>
B'xxxxxx00'	None
B'xxxxxx01'	Summer
B'xxxxxx10'	Winter
B'xxxxxx11'	Holiday
B'xxxx0xx'	Alarm 1 off
B'xxxx1xx'	Alarm 1 on
B'xxx0xxx'	Local alarm 1
B'xxx1xxx'	Global alarm 1
B'xx0xxxx'	Alarm 2 off
B'xx1xxxx'	Alarm 2 on
B'xx0xxxxx'	Local alarm 2
B'xx1xxxxx'	Global alarm 2
B'x0xxxxxx'	Sunrise disabled
B'x1xxxxxx'	Sunrise enabled
B'0xxxxxxx'	Sunset disabled
B'1xxxxxxx'	Sunset enabled

Transmit: 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 databytes to send

DATABYTE1 = COMMAND_CLEAR_LED (H'F5')

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 databytes to send

DATABYTE1 = COMMAND_SET_LED (H'F6')

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 databytes to send

DATABYTE1 = COMMAND_SLOW_BLINKING_LED (H'F7')

DATABYTE2 = LED bit numbers (1 = slow blink LED)

Transmit 'kWh counter status request':

SID10-SID9 = 11 (lowest priority)

SID8...SID1 = Module address

RTR = 0

DLC3...DLC0 = 3 databytes received

DATABYTE1 = COMMAND_ENERGY_COUNTER_STATUS_RQ (H'BD')

DATABYTE2 = energy counter channel 1 to 4

<i>Contents</i>	<i>Description</i>
B'xxxxxx1'	Channel 1
B'xxxxxx1x'	Channel 2
B'xxxx1xx'	Channel 3
B'xxxx1xxx'	Channel 4

DATABYTE3 = auto send interval

10...255s fixed interval

5...9 = auto send on change with 5s 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

‘Linked push button status’ received:

SID10-SID9 = 00 (highest priority)
 SID8...SID1 = Address of the linked push button module
 RTR = 0
 DLC3...DLC0 = 4 databytes received
 DATABYTE1 = COMMAND_PUSH_BUTTON_STATUS (H'00')
 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)

‘Real time clock status request’ command received:

SID10-SID9 = 11 (lowest priority)
 SID8...SID1 = H'00'
 RTR = 0
 DLC3...DLC0 = 1 databyte to send
 DATABYTE1 = COMMAND_REALTIME_CLOCK_STATUS_REQUEST (H'D7')

Remark: The real time clock status will only be send if master clock is on

‘Set real time clock’ command received:

SID10-SID9 = 11 (lowest priority)
 SID8...SID1 = H'00'
 RTR = 0
 DLC3...DLC0 = 4 databytes to send
 DATABYTE1 = COMMAND_SET_REALTIME_CLOCK (H'D8')
 DATABYTE2 = Day of week

<i>Contents day of week'</i>	<i>Description</i>
H'00'	Monday
H'01'	Tuesday
H'02'	Wednesday
H'03'	Thursday
H'04'	Friday
H'05'	Saturday
H'06'	Sunday

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

‘Set date’ command received:

SID10-SID9 = 11 (lowest priority)
 SID8...SID1 = H'00'
 RTR = 0
 DLC3...DLC0 = 5 databytes to send
 DATABYTE1 = COMMAND_SET_REALTIME_DATE (H'B7')
 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 = H'00'
 RTR = 0
 DLC3...DLC0 = 2 databytes to send
 DATABYTE1 = COMMAND_SET_DAYLIGHT_SAVING (H'AF')
 DATABYTE2 = 0 =disabled / 1 = enabled

‘Enable/disable global sunrise/sunset related actions’ command received:

SID10-SID9 = 11 (lowest priority)

SID8...SID1 = H'00'

RTR = 0

DLC3...DLC0 = 3 databytes to send

DATABYTE1 = COMMAND_ENA_DIS_SUNRISE_SUNSET (H'AE')

DATABYTE2 = Channel (FF)

DATABYTE3 = enable/disable flags

<i>Contents</i>	<i>Description</i>
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 databytes to send

DATABYTE1 = COMMAND_ENA_DIS_SUNRISE_SUNSET (H'AE')

DATABYTE2 = Channel (FF)

DATABYTE3 = enable/disable flags

<i>Contents</i>	<i>Description</i>
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 = H'00'

RTR = 0

DLC3...DLC0 = 7 databytes to send

DATABYTE1 = COMMAND_SET_ALARM_CLOCK (H'C3')

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 databytes to send

DATABYTE1 = COMMAND_SET_ALARM_CLOCK (H'C3')

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 databytes received

‘Module status request’ command received:

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

‘Channel name request’ command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 2 databytes received
DATABYTE1 = COMMAND_CHANNEL_NAME_REQUEST (H'EF')
DATABYTE2 = channel number (1...32)

Remark: channel = H'FF' for all 32 channel names

‘Clear channel LED’ command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address, subaddress1, subaddress2 or subaddress3
RTR = 0
DLC3...DLC0 = 2 databytes received
DATABYTE1 = COMMAND_CLEAR_LED (H'F5')
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, subaddress1, subaddress2 or subaddress3
RTR = 0
DLC3...DLC0 = 2 databytes received
DATABYTE1 = COMMAND_SET_LED (H'F6')
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, subaddress1, subaddress2 or subaddress3
RTR = 0
DLC3...DLC0 = 2 databytes received
DATABYTE1 = COMMAND_SLOW_BLINK_LED (H'F7')
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, subaddress1, subaddress2 or subaddress3
RTR = 0
DLC3...DLC0 = 2 databytes received
DATABYTE1 = COMMAND_FAST_BLINK_LED (H'F8')
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, subaddress1, subaddress2 or subaddress3
RTR = 0
DLC3...DLC0 = 2 databytes received
DATABYTE1 = COMMAND_VERY_FAST_BLINK_LED (H'F9')
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, subaddress1, subaddress2 or subaddress3
RTR = 0
DLC3...DLC0 = 4 databytes received
DATABYTE1 = COMMAND_UPDATE_LED_STATUS (H’F4’)
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 databytes received
DATABYTE1 = COMMAND_READ_DATA_FROM_MEMORY (H’FD’)
DATABYTE2 = High memory address
DATABYTE3 = LOW memory address

Remark: address range: H’0000’ to H’09FF’

‘Read data block from memory’ command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 3 databytes received
DATABYTE1 = COMMAND_READ_MEMORY_BLOCK (H’C9’)
DATABYTE2 = High memory address
DATABYTE3 = LOW memory address

Remark: address range: H’0000’ to H’09FC’

‘Memory dump request’ command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 1 databytes received
DATABYTE1 = COMMAND_MEMORY_DUMP_REQUEST (H’CB’)

‘Write data to memory’ command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 4 databytes received
DATABYTE1 = COMMAND_WRITE_DATA_TO_MEMORY (H’FC’)
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: H’0000’ to H’09FF’

Terminate always with a write command at the last memory location.

‘Write memory block’ command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 7 databytes received
DATABYTE1 = COMMAND_WRITE_MEMORY_BLOCK (H'CA')
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

Remark:

Wait for ‘memory data block’ feedback before sending a next command on the velbus.
Terminate always with a write command at the last memory location.
Address range: H'0000' to H'09FC'

‘Bus error counter status request’ command received:

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

‘Unlock channel’ command received:

SID10-SID9 = 00 (highest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 2 databytes received
DATABYTE1 = COMMAND_CANCEL_FORCED_OFF (H'13')
DATABYTE2 = Channel number (1...32)

Remark: channel number = H'FF' for all 32 channels

‘Lock channel’ command received:

SID10-SID9 = 00 (highest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 5 databytes received
DATABYTE1 = COMMAND_FORCED_OFF (H'12')
DATABYTE2 = Channel number (1...32)
DATABYTE3 = high byte of delay time
DATABYTE4 = mid byte of delay time
DATABYTE5 = low byte of delay time

Remark:

Channel number = H'FF' for all 32 channels
[DATABYTE3][DATABYTE4][DATABYTE5] contain a 24-bit time in seconds
The command will be skipped when the time parameter contains zero.
When the time parameter contains H'FFFFFF' 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 databytes received
DATABYTE1 = COMMAND_ENABLE_PROGRAM (H'B2')
DATABYTE2 = Channel number (1...32)

Remark: channel number = H'FF' for all 32 channels

'Disable Channel Program' command received:

SID10-SID9 = 11 (lowest priority)
 SID8...SID1 = Module address
 RTR = 0
 DLC3...DLC0 = 5 databytes received
 DATABYTE1 = COMMAND_DISABLE_PROGRAM (H'B1')
 DATABYTE2 = Channel number (1...32)
 DATABYTE3 = high byte of delay time
 DATABYTE4 = mid byte of delay time
 DATABYTE5 = low byte of delay time

Remark:

Channel number = H'FF' for all 32 channels
 [DATABYTE3][DATABYTE4][DATABYTE5] contain a 24-bit time in seconds
 The command will be skipped when the time parameter contains zero.
 When the time parameter contains 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 databytes received
 DATABYTE1 = COMMAND_SELECT_PROGRAM (H'B3')
 DATABYTE2 = Program mode

<i>Contents</i>	<i>Selected programl</i>
0	None
1	Summer
2	Winter
3	Holiday

'kWh status' command received:

SID10-SID9 = 11 (lowest priority)
 SID8...SID1 = kWh Counter Module address
 RTR = 0
 DLC3...DLC0 = 8 databytes to send
 DATABYTE1 = COMMAND_ENERGY_COUNTER_STATUS (H'BE')
 DATABYTE2 = energy counter channel 1 to 4 & number of pulses/kWh divide by 100

<i>Contents</i>	<i>Description</i>
B'xxxxxx00'	Channel 1
B'xxxxxx01'	Channel 2
B'xxxxxx10'	Channel 3
B'xxxxxx11'	Channel 4
B'000001xx'	100 pulses/kWh
B'000010xx'	200 pulses/kWh
...	...
B'001000xx'	800 pulses/kWh
...	...
B'001010xx'	1000 pulses/kWh
...	...
B'010100xx'	2000 pulses/kWh
...	...

DATABYTE3 = most significant byte of energy pulse counter
 DATABYTE4 = upper byte of energy pulse counter
 DATABYTE5 = high byte of energy pulse counter
 DATABYTE6 = low byte of energy pulse counter
 DATABYTE7 = high byte of period in ms between 2 energy pulses
 DATABYTE8 = low byte of period in ms between 2 energy pulses

Remark: a period counter contents of 0xFFFF means overflow

Energy in kWh = DATABYTE[3...6] / DATABYTE2[pulses/kWh factor]
 Power in W = 1000 * 1000 * 3600 / (DATABYTE[7..8] * DATABYTE2[pulses/kWh factor])

Memory map:

Address	Contents	Address	Contents
H'0000'	Channel 1 name character 1	H'0001'	Channel 1 name character 2
...
H'000E'	Channel 1 name character 15	H'000F'	Channel 1 name character 16
H'0010'	Channel 1 reaction time	H'0011'	Channel 1 start function
H'0012'	Channel 1 end function	H'0013'	Channel 1 mode
H'0014'	Channel 2 name character 1	H'0015'	Channel 2 name character 2
...
H'0022'	Channel 2 name character 15	H'0023'	Channel 2 name character 16
H'0024'	Channel 2 reaction time	H'0025'	Channel 2 start function
H'0026'	Channel 2 end function	H'0027'	Channel 2 mode
...
H'026C'	Channel 32 name character 1	H'026D'	Channel 32 name character 2
...
H'027A'	Channel 32 name character 15	H'027B'	Channel 32 name character 16
H'027C'	Channel 32 reaction time	H'027D'	Channel 32 start function
H'027E'	Channel 32 end function	H'027F'	Channel 32 mode
H'0280'	Long pressed delay	H'0281'	Dual function long pressed time
H'0282'	Led backlight intensity	H'0283'	Led intensity
H'0284'	Alarm clock configuration	H'0285'	Wake up 1 hour (0...23)
H'0286'	Wake up 1 minutes (0...59)	H'0287'	Go to bed 1 hour (0...23)
H'0288'	Go to bed 1 minutes (0...59)	H'0289'	Wake up 2 hour (0...23)
H'028A'	Wake up 2 minutes (0...59)	H'028B'	Go to bed 2 hour (0...23)
H'028C'	Go to bed 2 minutes (0...59)	H'028D'	Sunrise hour at 21 December (0...23)
H'028E'	Sunrise minutes at 21 December (0...59)	H'028F'	Sunrise 21 January – sunrise 5 January (-128'..127')
H'0290'	Sunrise 5 February – sunrise 21 January (-128'..127')	H'0291'	Sunrise 21 February – sunrise 5 February (-128'..127')
H'0292'	Sunrise 5 March – sunrise 21 February (-128'..127')	H'0293'	Sunrise 21 March – sunrise 5 March (-128'..127')
H'0294'	Sunrise 5 April – sunrise 21 March (-128'..127')	H'0295'	Sunrise 21 April – sunrise 5 April (-128'..127')
H'0296'	Sunrise 5 May – sunrise 21 April (-128'..127')	H'0297'	Sunrise 21 May – sunrise 5 May (-128'..127')
H'0298'	Sunrise 5 June – sunrise 21 May (-128'..127')	H'0299'	Sunrise 21 June – sunrise 5 June (-128'..127')
H'029A'	Sunrise 5 July – sunrise 21 June (-128'..127')	H'029B'	Sunrise 21 July – sunrise 5 July (-128'..127')
H'029C'	Sunrise 5 August – sunrise 21 July (-128'..127')	H'029D'	Sunrise 21 August – sunrise 5 August (-128'..127')
H'029E'	Sunrise 5 September – sunrise 21 August (-128'..127')	H'029F'	Sunrise 21 September – sunrise 5 September (-128'..127')
H'02A0'	Sunrise 5 October – sunrise 21 September (-128'..127')	H'02A1'	Sunrise 21 October – sunrise 5 October (-128'..127')
H'02A2'	Sunrise 5 November – sunrise 21 October (-128'..127')	H'02A3'	Sunrise 21 November – sunrise 5 November (-128'..127')
H'02A4'	Sunrise 5 December – sunrise 21 November (-128'..127')	H'02A5'	Sunrise 21 December – sunrise 5 December (-128'..127')
H'02A6'	Sunrise 5 January – sunrise 21 December (-128'..127')	H'02A7'	Sunset hour at 21 December (0...23)
H'02A8'	Sunset minutes at 21 December (0...59)	H'02A9'	Sunset 21 January – sunrise 5 January (-128'..127')
H'02AA'	Sunset 5 February – sunrise 21 January (-128'..127')	H'02AB'	Sunset 21 February – sunrise 5 February (-128'..127')
H'02AC'	Sunset 5 March – sunrise 21 February (-128'..127')	H'02AD'	Sunset 21 March – sunrise 5 March (-128'..127')
H'02AE'	Sunset 5 April – sunrise 21 March (-128'..127')	H'02AF'	Sunset 21 April – sunrise 5 April (-128'..127')
H'02B0'	Sunset 5 May – sunrise 21 April (-128'..127')	H'02B1'	Sunset 21 May – sunrise 5 May (-128'..127')
H'02B2'	Sunset 5 June – sunrise 21 May (-128'..127')	H'02B3'	Sunset 21 June – sunrise 5 June (-128'..127')
H'02B4'	Sunset 5 July – sunrise 21 June (-128'..127')	H'02B5'	Sunset 21 July – sunrise 5 July (-128'..127')
H'02B6'	Sunset 5 August – sunrise 21 July (-128'..127')	H'02B7'	Sunset 21 August – sunrise 5 August (-128'..127')
H'02B8'	Sunset 5 September – sunrise 21 August (-128'..127')	H'02B9'	Sunset 21 September – sunrise 5 September (-128'..127')
H'02BA'	Sunset 5 October – sunrise 21 September (-128'..127')	H'02BB'	Sunset 21 October – sunrise 5 October (-128'..127')
H'02BC'	Sunset 5 November – sunrise 21 October (-128'..127')	H'02BD'	Sunset 21 November – sunrise 5 November (-128'..127')
H'02BE'	Sunset 5 December – sunrise 21 November (-128'..127')	H'02BF'	Sunset 21 December – sunrise 5 December (-128'..127')
H'02C0'	Sunset 5 January – sunrise 21 December (-128'..127')	H'02C1'	Module settings
H'02C2'	Day Lcd Backlight Hour (0...23)	H'02C3'	Day Lcd Backlight Min (0...59)
H'02C4'	Day Lcd Backlight Value (0...74)	H'02C5'	Night Lcd Backlight Hour (0...23)
H'02C6'	Night Lcd Backlight Min (0...59)	H'02C7'	Night Lcd Backlight Value (0...74)
H'02C8'	kWh Counter 1 Address	H'02C9'	kWh Counter 1 channel
H'02CA'	kWh Counter 1 name character 1	H'02CB'	kWh Counter 1 name character 2
...
H'02D8'	kWh Counter 1 name character 15	H'02D9'	kWh Counter 1 name character 16
...
H'02FE'	kWh Counter 4 Address	H'02FF'	kWh Counter 1 channel
H'0300'	kWh Counter 4 name character 1	H'0301'	kWh Counter 4 name character 2
...
H'030E'	kWh Counter 4 name character 15	H'030F'	kWh Counter 4 name character 16
H'0310'	Display Pages	H'0311'	Language
...
H'031E'	Not used	H'031F'	Not used

Remark:

Unused locations contain H'FF'

Valid reaction times

<i>Contents</i>	<i>Reaction time</i>
H'05'	0.065s (default)
H'4C'	1s
H'99'	2s
H'E0'	3s
H'FF'	Channel disabled

Channel x start/end function

<i>Contents</i>	<i>Function</i>
1	Channel 1 (default & write protected)
2	Channel 2 (default & write protected)
...	...
31	Channel 31 (default & write protected)
32	Channel 32 (default & write protected)

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

<i>Contents</i>	<i>Description</i>
B'xxxxxxx0'	Dual function disabled (default & write protected)
B'xxxxxxx1'	Dual function enabled
B'xxxxxx0x'	Multi-function auto reset disabled (default & write protected)
B'xxxxxx1x'	Multi-function auto reset enabled
B'xxxxx0xx'	Led backlight off
B'xxxxx1xx'	Led backlight on (default)
B'xxxx0xxx'	Led feedback off
B'xxxx1xxx'	Led feedback on (default)
B'xxx0xxxx'	Slow blinking led feedback off
B'xxx1xxxx'	Slow blinking led feedback on (default)
B'xx0xxxxx'	Fast blinking led feedback off
B'xx1xxxxx'	Fast blinking led feedback on (default)
B'x0xxxxxx'	Very fast blinking led feedback off
B'x1xxxxxx'	Very fast blinking led feedback on (default)

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

<i>Contents</i>	<i>Reaction time</i>
H'40'	0.8s (default)
H'80'	1.6s

Valid dual function long pressed times

<i>Contents</i>	<i>Long pressed time</i>
H'4C'	1s
H'99'	2s (default & write protect)
H'E0'	3s

Led backlight intensity

Contents	Led backlight intensity
H'01'	Minimum (default)
...	...
H'40'	Maximum

Led intensity

Contents	Led intensity
H'01'	Minimum
...	...
H'3A'	Default
...	...
H'40'	Maximum

Alarm clock configuration

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

Module settings

Contents	Description
B'xxxxxxx0'	Master clock disabled (default)
B'xxxxxxx1'	Master clock enabled
B'0xxxxx0x'	Battery backup disabled (default)
B'1xxxxx1x'	Battery backup
B'xxxxx0xx'	Auto return to default page disabled (default)
B'xxxxx1xx'	Auto return to default page enabled
B'xxxx0xxx'	Page 1 as default page (default)
B'xxxx1xxx'	Clock page as default page
B'xxx0xxxx'	kWh counter 1 disabled (default)
B'xxx1xxxx'	kWh counter 1 enabled
B'xx0xxxxx'	kWh counter 2 disabled (default)
B'xx1xxxxx'	kWh counter 2 enabled
B'x0xxxxxx'	kWh counter 3 disabled (default)
B'x1xx1xxx'	kWh counter 3 enabled
B'0xxxxxxx'	kWh counter 4 disabled (default)
B'1xxxxxxx'	kWh counter 4 enabled

kWh Counter channel

Contents	Description
B'00000001'	kWh counter channel 1
B'00000010'	kWh counter channel 2
B'00000100'	kWh counter channel 3
B'00001000'	kWh counter channel 4

Display pages

Contents	Description
B'xxxxxxxxl'	Display page 1 always allowed (default)
B'xxxxxxxx0l'	Display page 2 not allowed
B'0xxxxxl'	Display page 2 allowed (default)
B'lxxxx0xl'	Display page 3 not allowed (default)
B'xxxxxl'	Display page 3 allowed
B'xxxx0xxl'	Display page 4 not allowed (default)
B'xxxxlxl'	Display page 4 allowed
B'xxx0xxl'	Display page 5 not allowed (default)
B'xxlxxl'	Display page 5 allowed
B'xx0xxxxl'	Display page 6 not allowed (default)
B'xxlxxxxl'	Display page 6 allowed
B'x0xxxxl'	Display page 7 not allowed (default)
B'xlxxxxl'	Display page 7 allowed
B'0xxxxxl'	Display page 8 not allowed (default)
B'lxxxxxl'	Display page 8 allowed

Language

Contents	Description
0	English (default)
1	Français
2	Nederlands
3	Espanol
4	Deutsch

Address	Contents	Address	Contents
H'0320'	Linked Push button 1 module address	H'0321'	Linked Push button 1 bit number
H'0322'	Linked Push button 1 action	H'0323'	Linked Push button 1 time parameter
H'0324'	Linked Push button 1 channel parameter	H'0325'	Linked Push button 2 module address
H'0326'	Linked Push button 2 bit number	H'0327'	Linked Push button 2 action
H'0328'	Linked Push button 2 time parameter	H'0329'	Linked Push button 2 channel parameter
H'032A'	...	H'032B'	...
...
H'04F4'	...	H'04F5'	...
H'04F6'	Linked Push button 95 module address	H'04F7'	Linked Push button 95 bit number
H'04F8'	Linked Push button 95 action	H'04F9'	Linked Push button 95 time parameter
H'04FA'	Linked Push button 95 channel parameter	H'04FB'	Linked Push button 96 module address
H'04FC'	Linked Push button 96 bit number	H'04FD'	Linked Push button 96 action
H'04FE'	Linked Push button 96 time parameter	H'04FF'	Linked Push button 96 channel parameter

Remark: Unused locations contain H'FF'

Action

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

<i>Address</i>	<i>Contents</i>	<i>Address</i>	<i>Contents</i>
H'0500'	Program step 1 byte1	H'0501'	Program step 1 byte2
H'0502'	Program step 1 byte3	H'0503'	Program step 1 byte4
H'0504'	Program step 1 byte5	H'0505'	Program step 1 byte6
...
H'08F6'	Program step 170 byte1	H'08F7'	Program step 170 byte2
H'08F8'	Program step 170 byte3	H'08F9'	Program step 170 byte4
H'08FA'	Program step 170 byte5	H'08FB'	Program step 170 byte6
H'08FC'	Not used	H'08FD'	Not used
H'08FE'	Not used	H'08FF'	Not used

<i>Contents program byte1</i>	<i>Description</i>
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

<i>Contents program byte2</i>	<i>Description</i>
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

<i>Contents program byte3</i>	<i>Description</i>
B'xxx00000'	0h
B'xxx00001'	1h
...	...
B'xxx10111'	23h
B'xx1xxxxx'	Program group 1 (Summer program)
B'x1xxxxxx'	Program group 2 (Winter program)
B'1xxxxxxx'	Program group 3 (Holiday program)

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

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

<i>Contents program byte5</i>	<i>Action</i>
0	0s25 Pulse
1	1s Pulse
2	2s Pulse
...	...
119	1min59s Pulse
120	2min Pulse
121	2min15s Pulse
...	...
131	4min45s Pulse
132	5min Pulse
133	5min30s Pulse
...	...
181	29min30s Pulse
182	30min Pulse
183	31min Pulse
...	...
211	59min Pulse
212	1h Pulse
213	1h15min Pulse
...	...
227	4h45min Pulse
228	5h Pulse
229	5h30min Pulse
...	...
237	9h30min Pulse
238	10h Pulse
239	11h Pulse
...	...
246	18h Pulse
247	Press
248	Long Press
249	Release
250	Lock
251	Unlock
252	No action
...	...
255	No action

<i>Contents program byte6</i>	Channel
1	Channel 1
2	Channel 2
..	...
31	Channel 31
32	Channel 32

<i>Address</i>	<i>Contents</i>	<i>Address</i>	<i>Contents</i>
H'0900'	Page 1 lcd text character 1	H'0901'	Page 1 lcd text character 2
...
H'091E'	Page 1 lcd text character 31	H'091F'	Page 1 lcd text character 32
H'0920'	Page 2 lcd text character 1	H'0921'	Page 2 lcd text character 2
...
H'093E'	Page 2 lcd text character 31	H'093F'	Page 2 lcd text character 32
...
H'09E0'	Page 8 lcd text character 1	H'09E1'	Page 8 lcd text character 2
...
H'09FE'	Page 8 lcd text character 31	H'09FF'	Page 8 lcd text character 32