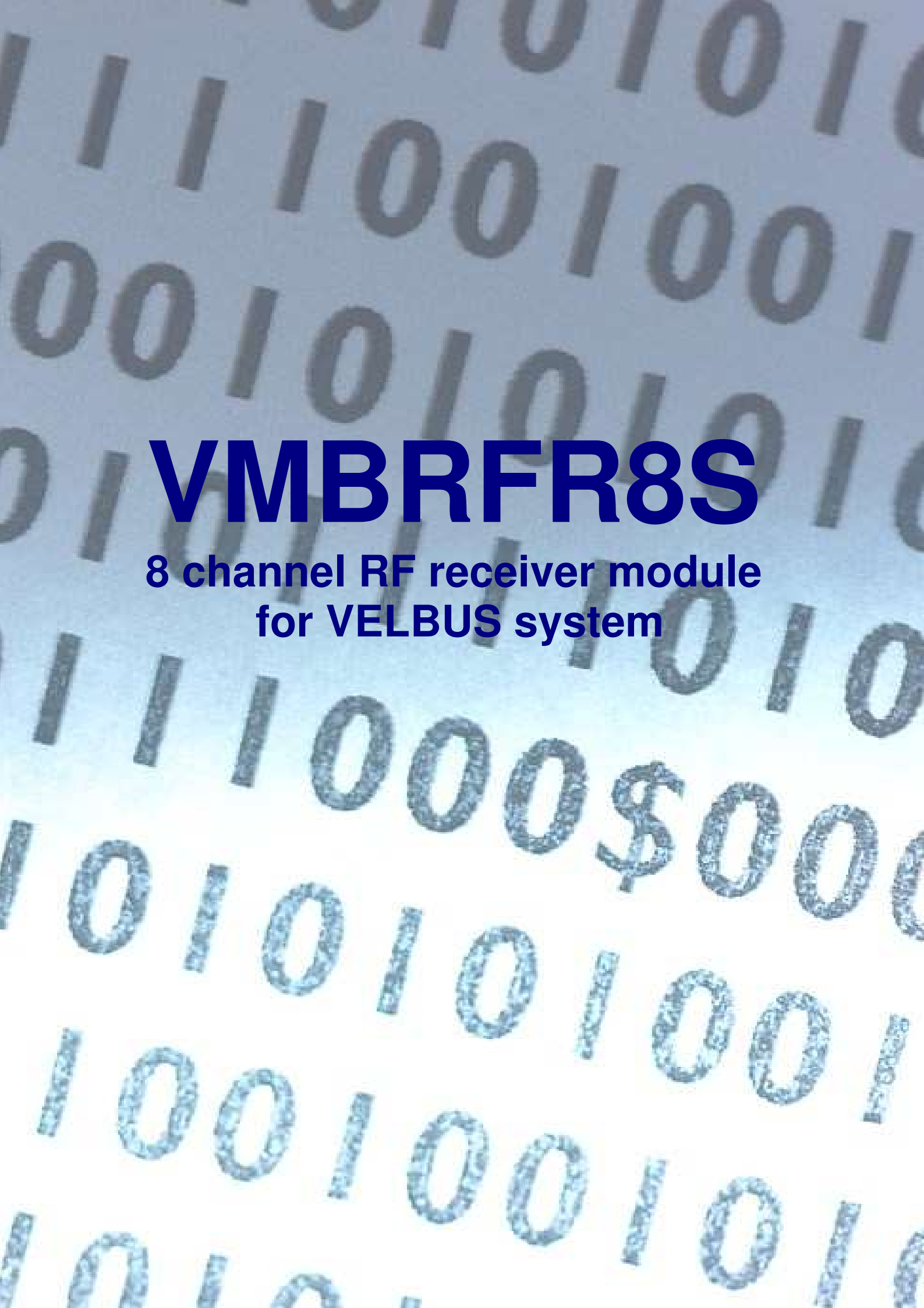

VMBRFR8S

8 channel RF receiver 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
- First, second and third part of the channel names
- Memory data
- Memory data block (4 bytes)
- Real-time clock status
- Date status
- Daylight savings status
- Real-time clock status request
- Clear linked push button led
- Set linked push button led
- Slow blink linked push button led
- Fast blink linked push button led

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)
- 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
- ***'Set operating mode' command received:***

Transmits real time clock status request:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = 0x00
RTR = 0
DLC3...DLC0 = 1 data byte to send
DATABYTE1 = COMMAND_REALTIME_CLOCK_STATUS_REQUEST (0xD7)

Transmits the real time clock status:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 4 data bytes to send
DATABYTE1 = COMMAND_REALTIME_CLOCK_STATUS (0xD8)
DATABYTE2 = Day

Contents	Day
0	Monday
1	Tuesday
2	Wednesday
3	Thursday
4	Friday
5	Saturday
6	Sunday

DATABYTE3 = Hour (0…23)
DATABYTE4 = Minute (0…59)

Transmits the date status:

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

Transmits the daylight savings status:

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

Transmits the channel switch status:

SID10-SID9 = 00 (highest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 4 data bytes to send
DATABYTE1 = COMMAND_PUSH_BUTTON_STATUS (0x00)
DATABYTE2 = Channel just pressed
DATABYTE3 = Channel just released
DATABYTE4 = Channel long pressed

Transmits the module type:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 7 data bytes to send
DATABYTE1 = COMMAND_MODULE_TYPE (0xFF)
DATABYTE2 = VMBRFR8S type (0x30)
DATABYTE3 = High byte of serial number
DATABYTE4 = Low byte of serial number
DATABYTE5 = Memory map version
DATABYTE6 = Build year
DATABYTE7 = Build week

Transmits the module status:

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

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 = operating mode

Contents	***Selected programl***
0	Normal mode
1	Learn start channel 1 for two, four & eight channel transmitter
2	Learn start channel 3 for two & four channel transmitter
3	Learn start channel 5 for two & four channel transmitter
4	Learn start channel 7 for two channel transmitter
9	Exiting learn mode
10	Erasing all transmitters

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 the first part of channel name:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 8 data bytes to send
DATABYTE1 = COMMAND_CHANNEL_NAME_PART1 (0xF0)
DATABYTE2 = channel bit

Contents	***Channel***
B'00000001'	channel 1
B'00000010'	channel 2
B'00000100'	channel 3
B'00001000'	channel 4
B'00010000'	channel 5
B'00100000'	channel 6
B'01000000'	channel 7
B'10000000'	channel 8

DATABYTE3 = Character 1 of the channel name
DATABYTE4 = Character 2 of the channel name
DATABYTE5 = Character 3 of the channel name
DATABYTE6 = Character 4 of the channel name
DATABYTE7 = Character 5 of the channel name
DATABYTE8 = Character 6 of the channel name

Transmits the second part of the channel name:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 8 data bytes to send
DATABYTE1 = COMMAND_CHANNEL_NAME_PART2 (0xF1)
DATABYTE2 = Channel bit

Contents	*Channel*
B'00000001'	channel 1
B'00000010'	channel 2
B'00000100'	channel 3
B'00001000'	channel 4
B'00010000'	channel 5
B'00100000'	channel 6
B'01000000'	channel 7
B'10000000'	channel 8

DATABYTE3 = Character 7 of the channel name
DATABYTE4 = Character 8 of the channel name
DATABYTE5 = Character 9 of the channel name
DATABYTE6 = Character 10 of the channel name
DATABYTE7 = Character 11 of the channel name
DATABYTE8 = Character 12 of the channel name

Transmits the third part of the channel name:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 6 data bytes to send
DATABYTE1 = COMMAND_CHANNEL_NAME_PART3 (0xF2)
DATABYTE2 = channel bit

Contents	*Channel*
B'00000001'	channel 1
B'00000010'	channel 2
B'00000100'	channel 3
B'00001000'	channel 4
B'00010000'	channel 5
B'00100000'	channel 6
B'01000000'	channel 7
B'10000000'	channel 8

DATABYTE3 = Character 13 of the channel name
DATABYTE4 = Character 14 of the channel name
DATABYTE5 = Character 15 of the channel name
DATABYTE6 = Character 16 of the channel name

Remarks:
Unused characters contain H'FF'.

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: Blinks LEDs fast on a linked push button module:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Address of the linked push button module for fast blinking LEDs
RTR = 0
DLC3...DLC0 = 2 data bytes to send
DATABYTE1 = COMMAND_FAST_BLINKING_LED (0xF8)
DATABYTE2 = LED bit numbers (1 = fast blink LED)

'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)

'Real time clock status request' command received:

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

'Set real time clock' command received:

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

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

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

'Set date' command received:

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

'Set daylight savings' command received:

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

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

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = 0x00
RTR = 0
DLC3...DLC0 = 3 data bytes to send
DATABYTE1 = COMMAND_ENA_DIS_SUNRISE_SUNSET (0xAE)
DATABYTE2 = Channel (0xFF)
DATABYTE3 = enable/disable flags

Contents	***Description***
B'xxxxxxx0'	Disable sunrise related actions
B'xxxxxxx1'	Enable sunrise related actions
B'xxxxxx0x'	Disable sunset related actions
B'xxxxxx1x'	Enable sunset related actions

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

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 3 data bytes to send
DATABYTE1 = COMMAND_ENA_DIS_SUNRISE_SUNSET (0xAE)
DATABYTE2 = Channel (0xFF)
DATABYTE3 = enable/disable flags

Contents	***Description***
B'xxxxxxx0'	Disable sunrise related actions
B'xxxxxxx1'	Enable sunrise related actions
B'xxxxxx0x'	Disable sunset related actions
B'xxxxxx1x'	Enable sunset related actions

'Set global clock alarm' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = 0x00
RTR = 0
DLC3...DLC0 = 7 data bytes to send
DATABYTE1 = COMMAND_SET_ALARM_CLOCK (0xC3)
DATABYTE2 = Alarm number (1 or 2)
DATABYTE3 = Wake up hour (0…23)
DATABYTE4 = Wake up minute (0…59)
DATABYTE5 = Go to bed hour (0…23)
DATABYTE6 = Go to bed minute (0…59)
DATABYTE7 = Clock alarm enable flag (0 = disabled / 1 = enabled)

'Set local clock alarm' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 7 data bytes to send
DATABYTE1 = COMMAND_SET_ALARM_CLOCK (0xC3)
DATABYTE2 = Alarm number (1 or 2)
DATABYTE3 = Wake up hour (0…23)
DATABYTE4 = Wake up minute (0…59)
DATABYTE5 = Go to bed hour (0…23)
DATABYTE6 = Go to bed minute (0…59)
DATABYTE7 = Clock alarm enable flag (0 = disabled / 1 = enabled)

'Module type request' command received:

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

'Module status request' command received:

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

'Channel name request' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 2 data bytes received
DATABYTE1 = COMMAND_CHANNEL_NAME_REQUEST (0xEF)
DATABYTE2 = channel bit

Contents	*Channel*
B'00000001'	channel 1
B'00000010'	channel 2
B'00000100'	channel 3
B'00001000'	channel 4
B'00010000'	channel 5
B'00100000'	channel 6
B'01000000'	channel 7
B'10000000'	channel 8

'Clear channel LED' command received:

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

'Set channel LED' command received:

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

'Slow blink channel LED' command received:

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

'Fast blink channel LED' command received:

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

'Very fast blink channel LED' command received:

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

'Update channel LEDs' command received:

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

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

'Read data from memory' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 3 data bytes received
DATABYTE1 = COMMAND_READ_DATA_FROM_MEMORY (0xFD)
DATABYTE2 = High memory address
DATABYTE3 = LOW memory address

Remark: address range: 0x0000 to 0x03FF

'Memory dump request' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 1 data byte 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
DATABYTE1 = COMMAND_READ_MEMORY_BLOCK (0xC9)
DATABYTE2 = High memory address
DATABYTE3 = LOW memory address

Remark: address range: 0x0000 to 0x03FC

'Write data to memory' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 4 data bytes received
DATABYTE1 = COMMAND_WRITE_DATA_TO_MEMORY (0xFC)
DATABYTE2 = High memory address
DATABYTE3 = LOW memory address (0x00...0xFF)
DATABYTE4 = memory data to write

Remark:
Wait at least 10ms for sending a next command on the velbus.
Address range: 0x0000 to 0x03FF

'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

Remark:
Wait for 'memory data block' feedback before sending a next command on the velbus.
Address range: 0x0000 to 0x03FC

'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 bit

Contents	*Channel*
B'00000001'	Channel 1
B'00000010'	Channel 2
...	...
B'10000000'	Channel 8

'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 bit

Contents	*Dimmer channel*
B'00000001'	Channel 1
B'00000010'	Channel 2
...	...
B'10000000'	Channel 8

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 bit

Contents	*Channel*
B'00000001'	Channel 1
B'00000010'	Channel 2
...	...
B'10000000'	Channel 8

'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*
B'00000001'	Channel 1
B'00000010'	Channel 2
...	...
B'10000000'	Channel 8

DATABYTE3 = high byte of delay time
DATABYTE4 = mid byte of delay time
DATABYTE5 = low byte of delay time

Remark:
[DATABYTE3][DATABYTE4][DATABYTE5] contain a 24-bit time in seconds
The command will be skipped when the time parameter contains zero.
When the time parameter contains 0xFFFFFF then the channel program will be permanently disabled.

'Select Program' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Module address
RTR = 0
DLC3...DLC0 = 2 data bytes received
DATABYTE1 = COMMAND_SELECT_PROGRAM (0xB3)
DATABYTE2 = Program mode

Contents	*Selected programl*
0	None
1	Summer
2	Winter
3	Holiday

'Set operating 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 (H'B5')
DATABYTE2 = Operating mode

Contents	***Operating mode***
1	Learn start channel 1 for two, four & eight channel transmitter
2	Learn start channel 3 for two & four channel transmitter
3	Learn start channel 5 for two & four channel transmitter
4	Learn start channel 7 for two channel transmitter
9	Exiting learn mode
10	Erasing all transmitters

Remark:
'Entering learn modes' and 'erasing all transmitters mode' is only possible from normal operation mode.
After changing the operating mode, the module sends his status.
There is a timeout of 5 minutes for the learn mode.

Memory map:

Addr.	*Contents*	*Addr.*	*Contents*
0x0000	Channel name character 1	0x0001	Channel 1 name character 2
...	...	...	...
0x000E	Channel 1name character 15	0x000F	Channel 1 name character 16
0x0010	Channel 2 name character 1	0x0011	Channel 2 name character 2
...	...	...	...
0x001E	Channel 2name character 15	0x001F	Channel 2 name character 16
0x0020	Channel 3 name character 1	0x0021	Channel 3 name character 2
...	...	...	...
0x002E	Channel 3name character 15	0x002F	Channel 3 name character 16
0x0030	Channel 4 name character 1	0x0031	Channel 4 name character 2
...	...	...	...
0x003E	Channel 4name character 15	0x003F	Channel 4 name character 16
0x0040	Channel 5 name character 1	0x0041	Channel 5 name character 2
...	...	...	...
0x004E	Channel 5name character 15	0x004F	Channel 5 name character 16
0x0050	Channel 6 name character 1	0x0051	Channel 6 name character 2
...	...	...	...
0x005E	Channel 6name character 15	0x005F	Channel 6 name character 16
0x0060	Channel 7 name character 1	0x0061	Channel 7 name character 2
...	...	...	...
0x006E	Channel 7name character 15	0x006F	Channel 7 name character 16
0x0070	Channel 8 name character 1	0x0071	Channel 8 name character 2
...	...	...	...
0x007E	Channel 8name character 15	0x007F	Channel 8 name character 16
0x0080	Channel 1 reaction time	0x0081	Channel 2 reaction time
...	…	...	...
0x0086	Channel 7 reaction time	0x0087	Channel 8 reaction time
0x0088	Channels inverted/non inverted	0x0089	Not used
0x008A	Not used	0x008C	Not used
0x008C	Not used	0x008D	Not used
0x008E	Not used	0x008F	Not used
0x0090	Program selection (none/summer/winter/holiday)	0x0091	Channel 8…1 prog disable/enable flags
0x0092	Channel 8…1 locked/unlocked flags	0x0093	Alarm clock configuration
0x0094	Wake up 1 hour (0…23)	0x0095	Wake up 1 minutes (0…59)
0x0096	Go to bed 1 hour (0…23)	0x0097	Go to bed 1 minutes (0…59)
0x0098	Wake up 2 hour (0…23)	0x0099	Wake up 2 minutes (0…59)
0x009A	Go to bed 2 hour (0…23)	0x009B	Go to bed 2 minutes (0…59)
0x009C	Channel 1 start function	0x009D	Channel 1 end function
...	…	...	...
0x00AA	Channel 8 start function	0x00AB	Channel 8 end function
0x00AC	Multi function channels 8…1 auto reset enable	0x00AD	Dual function channels 8…1 enable
0x00AE	Dual function long pressed time	0x00AF	Long pressed delay
0x00B0	Sunrise hour at 21 December (0…23)	0x00B1	Sunrise minutes at 21 December (0…59)
0x00B2	Sunrise 21 January – sunrise 5 January (-128'...127')	0x00B3	Sunrise 5 February – sunrise 21 January (-128'...127')
0x00B4	Sunrise 21 February – sunrise 5 February (-128'...127')	0x00B5	Sunrise 5 March – sunrise 21 February (-128'...127')
0x00B6	Sunrise 21 March – sunrise 5 March (-128'...127')	0x00B7	Sunrise 5 April – sunrise 21 March (-128'...127')
0x00B8	Sunrise 21 April – sunrise 5 April (-128'...127')	0x00B9	Sunrise 5 May – sunrise 21 April (-128'...127')
0x00BA	Sunrise 21 May – sunrise 5 May (-128'...127')	0x00BB	Sunrise 5 June – sunrise 21 May (-128'...127')
0x00BC	Sunrise 21 June – sunrise 5 June (-128'...127')	0x00BD	Sunrise 5 July – sunrise 21 June (-128'...127')
0x00BE	Sunrise 21 July – sunrise 5 July (-128'...127')	0x00BF	Sunrise 5 August – sunrise 21 July (-128'...127')
0x00C0	Sunrise 21 August – sunrise 5 August (-128'...127')	0x00C1	Sunrise 5 September – sunrise 21 August (-128'...127')
0x00C2	Sunrise 21 September – sunrise 5 September (-128..127')	0x00C3	Sunrise 5 October – sunrise 21 September (-128'...127')
0x00C4	Sunrise 21 October – sunrise 5 October (-128'...127')	0x00C5	Sunrise 5 November – sunrise 21 October (-128'...127')
0x00C6	Sunrise 21 November – sunrise 5 November (-128'...127')	0x00C7	Sunrise 5 December – sunrise 21 November (-128'...127')
0x00C8	Sunrise 21 December – sunrise 5 December (-128'...127')	0x00C9	Sunrise 5 January – sunrise 21 December (-128'...127')

Addr.	*Contents*	*Addr.*	*Contents*
0x00CA	Sunset hour at 21 December (0…23)	0x00CB	Sunset minutes at 21 December (0…59)
0x00CC	Sunset 21 January – sunrise 5 January (-128'...127')	0x00CD	Sunset 5 February – sunrise 21 January (-128'...127')
0x00CE	Sunset 21 February – sunrise 5 February (-128'...127')	0x00CF	Sunset 5 March – sunrise 21 February (-128'...127')
0x00D0	Sunset 21 March – sunrise 5 March (-128'...127')	0x00D1	Sunset 5 April – sunrise 21 March (-128'...127')
0x00D2	Sunset 21 April – sunrise 5 April (-128'...127')	0x00D3	Sunset 5 May – sunrise 21 April (-128'...127')
0x00D4	Sunset 21 May – sunrise 5 May (-128'...127')	0x00D5	Sunset 5 June – sunrise 21 May (-128'...127')
0x00D6	Sunset 21 June – sunrise 5 June (-128'...127')	0x00D7	Sunset 5 July – sunrise 21 June (-128'...127')
0x00D8	Sunset 21 July – sunrise 5 July (-128'...127')	0x00D9	Sunset 5 August – sunrise 21 July (-128'...127')
0x00DA	Sunset 21 August – sunrise 5 August (-128'...127')	0x00DA	Sunset 5 September – sunrise 21 August (-128'...127')
0x00DC	Sunset 21 September – sunrise 5 September (-128'...127')	0x00DC	Sunset 5 October – sunrise 21 September (-128'...127')
0x00DE	Sunset 21 October – sunrise 5 October (-128'...127')	0x00DF	Sunset 5 November – sunrise 21 October (-128'...127')
0x00E0	Sunset 21 November – sunrise 5 November (-128'...127')	0x00E1	Sunset 5 December – sunrise 21 November (-128'...127')
0x00E2	Sunset 21 December – sunrise 5 December (-128'...127')	0x00E3	Sunset 5 January – sunrise 21 December (-128'...127')
0x00E4	Not used	0x00E5	Not used
…	…		…
0x00F8	Module terminator	0x00F9	Current day (1…31)
0x00FA	Current month (1…12)	0x00FB	Current year high byte
0x00FC	Current year low byte	0x00FD	Module Address
0x00FE	Serial number high	0x00FF	Serial number low

Remark:
Unused locations contain 0xFF
Do not overwrite the following address location:

0x0090	program selection
0x0091	channel program enable/disable
0x0092	channel locked/unlocked
0x00F9	current day of month
0x00FA	current month
0x00FB & 0x00FC	current year
0x00FD	module address
0x00FE & 0x00FF	module serial number

Valid reaction times

Contents	*Reaction time*
0x05	0.065s
0x26	0.5s
0x4C	1s
0x99	2s
0xE0	3s
0xFF	Channel disabled

Valid long pressed delay

Contents	*Reaction time*
0x40	0.8s
0x80	1.6s
0xFF	Default 0.8s

Channels inverted

Contents	*Led feedback*
B'xxxxxxx0'	Channel 1 inverted
B'xxxxxxx1'	Channel 1 not inverted
...	...
B'0xxxxxxx'	Channel 8 inverted
B'1xxxxxxx'	Channel 8 non inverted

Program selection

Contents	*Selected program*
0	None
1	Program group 1
2	Program group 2
3	Program group 3

Channel program disabled

Contents	*Channel program enabled/disabled*
B'xxxxxxx0'	Channel 1 programs enabled
B'xxxxxxx1'	Channel 1 programs disabled
...	...
B'0xxxxxxx'	Channel 8 programs enabled
B'1xxxxxxx'	Channel 8 programs disabled

Channel locked

Contents	*Channel locked/unlocked*
B'xxxxxxx0'	Channel 1 unlocked
B'xxxxxxx1'	Channel 1 locked
...	...
B'0xxxxxxx'	Channel 8 unlocked
B'1xxxxxxx'	Channel 8 locked

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'	Summer time disabled
B'x1xxxxxx'	Summer time enabled

Channel x start/end function

Contents	*Function*
B'00000001'	Channel 1
B'00000010'	Channel 2
...	...
B'01000000'	Channel 7
B'10000000'	Channel 8

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

Multi-function auto reset

Contents	*Multi-function auto reset*
B'xxxxxxx0'	Channel 1 auto reset disabled
B'xxxxxxx1'	Channel 1 auto reset enabled
...	...
B'0xxxxxxx'	Channel 8 auto reset disabled
B'1xxxxxxx'	Channel 8 auto reset enabled

Remark: When auto reset is enabled, the start function will be loaded again after 3 seconds inactivity of the channel.

Dual function enable

Contents	*Dual function*
B’xxxxxxx0’	Channel 1 dual function disabled
B’xxxxxxx1’	Channel 1 dual function enabled
...	...
B’0xxxxxxx’	Channel 8 dual function disabled
B’1xxxxxxx’	Channel 8 dual function enabled

Remark:

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 dual function long pressed times

Contents	*Long pressed time*
0x4C	1s
0x99	2s
0xE0	3s

Address	*Contents*	*Address*	*Contents*
0x0100	Linked Push button 1 module address	0x0101	Linked Push button 1 bit number
0x0102	Linked Push button 1 action	0x0103	Linked Push button 1 time parameter
0x0104	Linked Push button 1 channel parameter	0x0105	Linked Push button 2 module address
0x0106	Linked Push button 2 bit number	0x0107	Linked Push button 2 action
0x0108	Linked Push button 2 time parameter	0x0109	Linked Push button 2 channel parameter
0x010A	…	0x010B	…
...	...	...	...
...	…	0x01F5	Linked Push button 50 module address
0x01F6	Linked Push button 50 bit number	0x01F7	Linked Push button 50 action
0x01F8	Linked Push button 50 time parameter	0x01F9	Linked Push button 50 channel parameter
0x01FA	Linked Push button 51 module address	0x01FB	Linked Push button 51 bit number
0x01FC	Linked Push button 51 action	0x01FD	Linked Push button 51 time parameter
0x01FE	Linked Push button 51 channel parameter	0x01FF	Not used

Remark: Unused locations contain H'FF'

Action

Action number	**Action**	**Time parameter**	**Bit number**
0	Switch status led indication	-	Channel bit
1	Lock channel at closed switch	-	Channel bit
2	Lock channel at opened switch	-	Channel bit
3	Lock channel	Timeout	Channel bit
4	Lock/unlock channel	Timeout	Channel bit
5	Unlock channel	-	Channel bit
6	Disable channel program at closed switch	-	Channel bit
7	Disable channel program at opened switch	-	Channel bit
8	Disable channel program channel	Timeout	Channel bit
9	Disable/enable channel program	Timeout	Channel bit
10	Enable channel program	-	Channel bit
11	Select no programs	-	-
12	Select summer programs	-	-
13	Select winter programs	-	-
14	Select holiday programs	-	-
15	Enable Alarm/Sunrise/Sunset at closed switch	-	Alarm/sunrise/sunset bit
16	Enable Alarm/Sunrise/Sunset at open switch	-	Alarm/sunrise/sunset bit
17	Disable Alarm/Sunrise/Sunset at closed switch	-	Alarm/sunrise/sunset bit
18	Disable Alarm/Sunrise/Sunset at open switch	-	Alarm/sunrise/sunset bit
19	Enable Alarm/Sunrise/Sunset	-	Alarm/sunrise/sunset bit
20	Enable/Disable Alarm/Sunrise/Sunset	-	Alarm/sunrise/sunset bit
21	Disable Alarm/Sunrise/Sunset	-	Alarm/sunrise/sunset bit

Bit Number

Contents	*Bit number*
B'00000001'	Channel 1 or Alarm1
B'00000010'	Channel 2
B'00000100'	Channel 3 or Alarm2
B'00001000'	Channel 4
B'00010000'	Channel 5 or Sunrise
B'00100000'	Channel 6 or Sunset
B'01000000'	Channel 7
B'10000000'	Channel 8

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*
0x0200	Program step 1 byte1	0x0201	Program step 1 byte2
0x0202	Program step 1 byte3	0x0203	Program step 1 byte4
0x0204	Program step 1 byte5	0x0205	Program step 1 byte6
…	..	..	..
0x03B6	Program step 74 byte1	0x03B7	Program step 74 byte2
0x03B8	Program step 74 byte3	0x03B9	Program step 74 byte4
0x03BA	Program step 74 byte5	0x03BB	Program step 74 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
…	…
B'xx111011'	59min

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

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

Contents program byte6	**Channel**
B’00000001’	Channel 1
B’00000010’	Channel 2
B’00000100’	Channel 3
B’00001000’	Channel 4
B’00010000’	Channel 5
B’00100000’	Channel 6
B’01000000’	Channel 7
B’10000000’	Channel 8

Address	*Contents*	*Address*	*Contents*
0x03BC	Location id low byte	0x03BD	Location id high byte
0x03BE	Group id low byte	0x03BF	Group id high byte
0x03C0	Module name character 1	0x03C1	Module name character 2
…	..	..	..
0x03FE	Module name character 63	0x03FF	Module name character 64