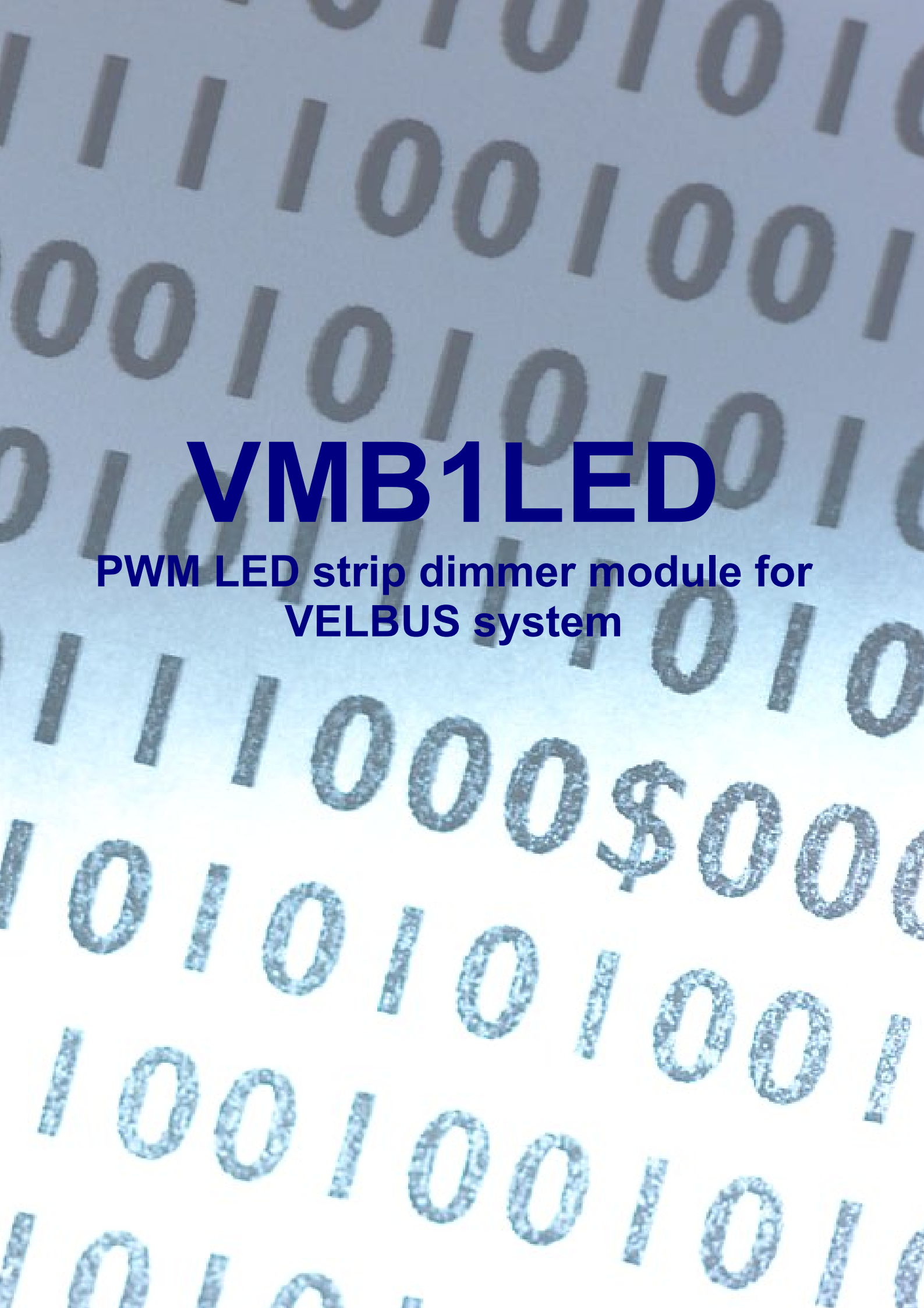

VMB1LED

PWM LED strip dimmer 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 dimmer module can transmit the following commands:

- Updates LEDs on a push button module
- Clears LEDs on a push button module
- Sets LEDs on a push button module
- Blinks LEDs slowly on a push button module
- Blinks LEDs fast on a push button module
- Blinks LEDs very fast on a push button module

The dimmer module can transmit the following messages:

- Dimmer status
- Module type
- Local dim push button & dimmer switch status
- Dimmer slider status
- Bus error counter status
- First, second and third part of the dimmer name
- First, second and third part of the local dim push button name
- Memory data
- Memory data block (4 bytes)

The dimmer module can receive the following messages:

- Push button status
- Slider status

The dimmer module can receive the following commands:

- Set dimmer value
- Set dimmer at last used dimvalue (Build 1006 or higher)
- Start dimmer timer
- Stop dimming (Build 1005 or higher)
- Dimmer status request
- Clear Push button Led
- Module type request
- Bus error counter status request

- Dimmer and/or local dim push button name request
- Read memory data
- Read memory data block (4 bytes)
- Memory dump request
- Write memory data
- Write memory data block (4 bytes)

Transmits the local dim push button & dimmer switch status:

SID10-SID9 = 00 (highest priority)
SID8...SID1 = Address set by hex switches
RTR = 0
DLC3...DLC0 = 4 databytes to send
DATABYTE1 = COMMAND_PUSH_BUTTON_STATUS (H'00')
DATABYTE2 = Local dim push buttons just pressed / dimmer just switched on (1 = just pressed / switched on)
DATABYTE3 = Local dim push buttons just released / dimmer just switched off (1 = just released / switched off)
DATABYTE4 = Local dim push buttons long pressed (1 = longer than 0.85s pressed)

	Databyte2	***Databyte3***	***Databyte4***
Dimmer just switched on	B'000x0001'	B'000x0000'	B'000x0000'
Dimmer just switched off	B'000x0000'	B'000x0001'	B'000x0000'
Local Dim Push button just pressed	B'0001000x'	B'0000000x'	B'00000000'
Local Dim Push button just long pressed	B'0000000x'	B'0000000x'	B'00010000'
Local Dim Push button just released	B'0000000x'	B'0001000x'	B'00000000'

Transmits dimmer slider status:

SID10-SID9 = 00 (highest priority)
SID8...SID1 = Address set by hex switches
RTR = 0
DLC3...DLC0 = 4 databytes to send
DATABYTE1 = COMMAND_SLIDER_STATUS (H'0F')
DATABYTE2 = Dimmer slider channel (H'01')
DATABYTE3 = Dimmer value 0...100% (slider status)
DATABYTE4 = H'00' (Slider channel not long pressed)

Transmit: Updates LEDs on a push button module:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Address of the push button module for updating the LEDs
RTR = 0
DLC3...DLC0 = 4 databytes to send
DATABYTE1 = COMMAND_UPDATE_LED (H'F4')
DATABYTE2 = LED continuous on status (1 = LED on)
DATABYTE3 = LED slow blinking status (1 = LED slow blinking)
DATABYTE4 = LED fast blinking status (1 = LED fast blinking)

Remarks:
The continuous on bit overrides the blinking modes.
If the slow and fast blinking bits for a LED are both on, the LED blinks very fast.

Transmit: Clears LEDs on a push button module:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Address of the 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 push button module:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Address of the 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 push button module:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Address of the 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: Blinks LEDs fast on a push button module:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Address of the push button module for fast blinking LEDs
RTR = 0
DLC3...DLC0 = 2 databytes to send
DATABYTE1 = COMMAND_FAST_BLINKING_LED (H'F8')
DATABYTE2 = LED bit numbers (1 = fast blink LED)

Transmit: Blinks LEDs very fast on a push button module:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Address of the push button module for very fast blinking LEDs
RTR = 0
DLC3...DLC0 = 2 databytes to send
DATABYTE1 = COMMAND_VERYFAST_BLINKING_LED (H'F9')
DATABYTE2 = LED bit numbers (1 = very fast blink LED)

Transmits the dimmer status:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Address set by hex switches
RTR = 0
DLC3...DLC0 = 8 databytes to send
DATABYTE1 = COMMAND_DIMMER_STATUS (H'EE')
DATABYTE2 = Mode setting

Contents	*Mode*
0	Start/stop timer
1	Staircase timer
2	Dimmer
3	Dimmer with memory
4	Multi step dimmer
5	Slow on dimmer
6	Slow off dimmer
7	Slow on/off dimmer

DATABYTE3 = Dimvalue (0 to 100%)
DATABYTE4 = Led status

Contents	*Mode*
B'00000000'	LED off
B'10000000'	LED on
B'01000000'	LED slow blinking
B'00100000'	LED fast blinking
B'00010000'	LED very fast blinking

DATABYTE5 = high byte of current delay time
DATABYTE6 = mid byte of current delay time
DATABYTE7 = low byte of current delay time
DATABYTE8 = dimmer configuration

Contents	*Contents*
B'1xxxx000'	Last 3 bits = version number

Remark: [DATABYTE5][DATABYTE6][DATABYTE7] contain a 24-bit time in seconds

Transmits the module type:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Address set by hex switches
RTR = 0
DLC3...DLC0 = 7 databytes to send
DATABYTE1 = COMMAND_MODULE_TYPE (H'FF')
DATABYTE2 = PWM_LED_STRIP_DIMMER_MODULE (H'0F')
DATABYTE3 = Mode setting

Contents	*Mode*
0	Start/stop timer
1	Staircase timer
2	Dimmer
3	Dimmer with memory
4	Multi step dimmer
5	Slow on dimmer
6	Slow off dimmer
7	Slow on/off dimmer

DATABYTE4 = Time switch setting

Contents	*Time*
0	Momentary
1	5s
2	10s
3	15s
4	30s
5	1min
6	2min
7	5min
8	10min
9	15min
A	30min
B	1h
C	2h
D	5h
E	1day
F	No timer or max dimspeed

DATABYTE5 = dimmer configuration

Contents	*Contents*
B'1xxxx000'	Last 3 bits = version number

DATABYTE6 = Build Year
DATABYTE7 = Build Week

Transmit: Bus error counter status

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Address set by hex switches
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 first part of the dimmer name:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Address set by hex switches
RTR = 0
DLC3...DLC0 = 8 databytes to send
DATABYTE1 = COMMAND_DIMMER_NAME_PART1 (H'F0')
DATABYTE2 = Dimmer bit number (B'00000001')
DATABYTE3 = Character 1 of the dimmer name
DATABYTE4 = Character 2 of the dimmer name
DATABYTE5 = Character 3 of the dimmer name
DATABYTE6 = Character 4 of the dimmer name
DATABYTE7 = Character 5 of the dimmer name
DATABYTE8 = Character 6 of the dimmer name

Transmits the second part of the dimmer name:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Address set by hex switches
RTR = 0
DLC3...DLC0 = 8 databytes to send
DATABYTE1 = COMMAND_DIMMER_NAME_PART2 (H'F1')
DATABYTE2 = Dimmer bit number (B'00000001')
DATABYTE3 = Character 7 of the dimmer name
DATABYTE4 = Character 8 of the dimmer name
DATABYTE5 = Character 9 of the dimmer name
DATABYTE6 = Character 10 of the dimmer name
DATABYTE7 = Character 11 of the dimmer name
DATABYTE8 = Character 12 of the dimmer name

Transmits the third part of the dimmer name:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Address set by hex switches
RTR = 0
DLC3...DLC0 = 6 databytes to send
DATABYTE1 = COMMAND_DIMMER_NAME_PART3 (H'F2')
DATABYTE2 = Dimmer bit number (B'00000001')
DATABYTE3 = Character 13 of the dimmer name
DATABYTE4 = Character 14 of the dimmer name
DATABYTE5 = Character 15 of the dimmer name
DATABYTE6 = Character 16 of the dimmer name

Remarks:
Unused characters contain H'FF'.

Transmits the first part of the local dim push button name:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Address set by hex switches
RTR = 0
DLC3...DLC0 = 8 databytes to send
DATABYTE1 = COMMAND_PUSH_BUTTON_NAME_PART1 (H'F0')
DATABYTE2 = Push button identifier bit (B'00010000')
DATABYTE3 = Character 1 of the local dim push button name
DATABYTE4 = Character 2 of the local dim push button name
DATABYTE5 = Character 3 of the local dim push button name
DATABYTE6 = Character 4 of the local dim push button name
DATABYTE7 = Character 5 of the local dim push button name
DATABYTE8 = Character 6 of the local dim push button name

Transmits the second part of the local dim push button name:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Address set by hex switches
RTR = 0
DLC3...DLC0 = 8 databytes to send
DATABYTE1 = COMMAND_PUSH_BUTTON_NAME_PART2 (H'F1')
DATABYTE2 = Push button identifier bit (B'00010000')
DATABYTE3 = Character 7 of the local dim push button name
DATABYTE4 = Character 8 of the local dim push button name
DATABYTE5 = Character 9 of the local dim push button name
DATABYTE6 = Character 10 of the local dim push button name
DATABYTE7 = Character 11 of the local dim push button name
DATABYTE8 = Character 12 of the local dim push button name

Transmits the third part of the local dim push button name:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Address set by hex switches
RTR = 0
DLC3...DLC0 = 6 databytes to send
DATABYTE1 = COMMAND_PUSH_BUTTON_NAME_PART3 (H'F2')
DATABYTE2 = Push button identifier bit (B'00010000')
DATABYTE3 = Character 13 of the local dim push button name
DATABYTE4 = Character 14 of the local dim push button name
DATABYTE5 = Character 15 of the local dim push button name
DATABYTE6 = Character 16 of the local dim push button name

Remarks: Unused characters contain H'FF'.

Transmits the memory data:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Address set by hex switches
RTR = 0
DLC3...DLC0 = 4 databytes to send
DATABYTE1 = COMMAND_MEMORY_DATA (H'FE')
DATABYTE2 = High memory address (must be H'00')
DATABYTE3 = LOW memory address (H'00'...H'FF')
DATABYTE4 = memory data

Transmits memory data block (4 bytes):

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Address of the module
RTR = 0
DLC3...DLC0 = 4 databytes to send
DATABYTE1 = COMMAND_MEMORY_DATA_BLOCK (H'CC')
DATABYTE2 = High start address of memory block (must be H'00')
DATABYTE3 = LOW start address of memory block (H'00'...H'FC')
DATABYTE4 = memory data1
DATABYTE5 = memory data2
DATABYTE6 = memory data3
DATABYTE7 = memory data4

'Push button status' received:

SID10-SID9 = 00 (highest priority)
SID8...SID1 = Address of the push button module
RTR = 0
DLC3...DLC0 = 4 databytes received
DATABYTE1 = COMMAND_PUSH_BUTTON_STATUS (H'00')
DATABYTE2 = Push buttons just pressed (1 = just pressed)
DATABYTE3 = Push buttons just released (1 = just released)
DATABYTE4 = Push buttons long pressed (1 = longer than 0.85s pressed)

'Slider status' received:

SID10-SID9 = 00 (highest priority)
SID8...SID1 = Address of the slider module
RTR = 0
DLC3...DLC0 = 4 databytes received
DATABYTE1 = COMMAND_SLIDER_STATUS (H'0F')
DATABYTE2 = Slider channel
DATABYTE3 = Slider status (0...100%)
DATABYTE4 = Slider channel long pressed (1 = longer than 0.85s pressed)

'Clear LED' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Address of the push button module
RTR = 0
DLC3...DLC0 = 2 databytes received
DATABYTE1 = COMMAND_CLEAR_LED (H'F5')
DATABYTE2 = LEDs to clear (a one clears the corresponding LED)

'Set dimvalue' command received:

SID10-SID9 = 00 (highest priority)
SID8...SID1 = Address set by hex switches
RTR = 0
DLC3...DLC0 = 5 databytes received
DATABYTE1 = COMMAND_SET_DIMVALUE (H'07')
DATABYTE2 = Dimmer bit number (B'00000001')
DATABYTE3 = Dimvalue (0 to 100%)
DATABYTE4 = high byte of dimspeed
DATABYTE5 = low byte of dimspeed

Remark: [DATABYTE4][DATABYTE5] contains a 16-bit time in seconds needed for dimming from 0 to 100%.
If the dimspeed parameter contains zero then the dimspeed set by the hex switches on the dimmer module is chosen.
If the dimspeed parameter contains H'FFFF' then the fastest dimspeed (1.5s) is chosen.

'Set dimvalue at last used dimvalue' command received (Build 1006 or higher):

SID10-SID9 = 00 (highest priority)
SID8...SID1 = Address set by hex switches
RTR = 0
DLC3...DLC0 = 5 databytes received
DATABYTE1 = COMMAND_RESTORE_LAST_DIMVALUE (H'11')
DATABYTE2 = Dimmer bit number (B'00000001')
DATABYTE3 = Don't care
DATABYTE4 = high byte of dimspeed
DATABYTE5 = low byte of dimspeed

Remark: [DATABYTE4][DATABYTE5] contains a 16-bit time in seconds needed for dimming from 0 to 100%.
If the dimspeed parameter contains zero then the dimspeed set by the hex switches on the dimmer module is chosen.
If the dimspeed parameter contains H'FFFF' then the fastest dimspeed (1.5s) is chosen.

'Stop dimming' command received (build 1005 or higher):

SID10-SID9 = 00 (highest priority)
SID8...SID1 = Address set by hex switches
RTR = 0
DLC3...DLC0 = 2 databytes received
DATABYTE1 = COMMAND_STOP_DIMMING (H'10')
DATABYTE2 = Dimmer bit number (B'00000001')

'Start dimmer timer' command received:

SID10-SID9 = 00 (highest priority)
SID8...SID1 = Address set by hex switches
RTR = 0
DLC3...DLC0 = 5 databytes received
DATABYTE1 = COMMAND_START_DIMMER_TIMER (H'08')
DATABYTE2 = Dimmer bit number (B'00000001')
DATABYTE3 = high byte of time-out time
DATABYTE4 = mid byte of time-out time
DATABYTE5 = low byte of time-out time

Remark: [DATABYTE3][DATABYTE4][DATABYTE5] contains a 24-bit time-out time in seconds.
If the time-out parameter contains zero then the timer starts for a time set by the hex switches on the dimmer module.
If the time-out parameter contains H'FFxxxx' then the light switches permanently on (no time-out).

'Dimmer status request' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Address set by hex switches
RTR = 0
DLC3...DLC0 = 2 databytes received
DATABYTE1 = COMMAND_DIMMER_STATUS_REQUEST (H'FA')
DATABYTE2 = Dimmer bit number (B'00000001')

'Module type request' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Address set by hex switches
RTR = 1
DLC3...DLC0 = 0 databytes received

'Bus error counter status request' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Address set by hex switches
RTR = 0
DLC3...DLC0 = 1 databytes to send
DATABYTE1 = COMMAND_BUS_ERROR_CONTER_STATUS_REQUEST (H'D9')

'Dimmer and/or dim push button name request' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Address set by hex switches
RTR = 0
DLC3...DLC0 = 2 databytes received
DATABYTE1 = COMMAND_DIMMER_NAME_REQUEST (H'EF')
DATABYTE2 = Dimmer and/or dim push button bit number (B'00000001' : dimmer identifier)
(B'00010000' : dim push button identifier)

'Read data from memory' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Address set by hex switches
RTR = 0
DLC3...DLC0 = 3 databytes received
DATABYTE1 = COMMAND_READ_DATA_FROM_MEMORY (H'FD')
DATABYTE2 = High memory address (must be H'00')
DATABYTE3 = LOW memory address (H'00'...H'FF')

'Memory dump request' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Address of the module
RTR = 0
DLC3...DLC0 = 1 databytes received
DATABYTE1 = COMMAND_MEMORY_DUMP_REQUEST (H'CB')

'Read data block from memory' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Address set by hex switches
RTR = 0
DLC3...DLC0 = 3 databytes received
DATABYTE1 = COMMAND_READ_MEMORY_BLOCK (H'C9')
DATABYTE2 = High memory address (must be H'00')
DATABYTE3 = LOW memory address (H'00'...H'FC')

'Write data to memory' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Address set by hex switches
RTR = 0
DLC3...DLC0 = 4 databytes received
DATABYTE1 = COMMAND_WRITE_DATA_TO_MEMORY (H'FC')
DATABYTE2 = High memory address (must be H'00')
DATABYTE3 = LOW memory address (H'00'...H'FF')
DATABYTE4 = memory data to write

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

'Write memory block' command received:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Address set by hex switches
RTR = 0
DLC3...DLC0 = 7 databytes received
DATABYTE1 = COMMAND_WRITE_MEMORY_BLOCK (H'CA')
DATABYTE2 = High memory address (must be H'00')
DATABYTE3 = LOW memory address (H'00'...H'FC')
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.

Memory map build 0947 or 1005:

Address	*Contents*	*Address*	*Contents*
H'0000'	Push button module address	H'0001'	Clear push button 1 bit numbers
...	...	...	...
H'0016'	Push button module address	H'0017'	Clear push button 12 bit numbers
H'0018'	Push button module address	H'0019'	Set push button 1 bit numbers
...	...	...	...
H'002E'	Push button module address	H'002F'	Set push button 12 bit numbers
H'0030'	Push button module address	H'0031'	Toggle push button 1 bit numbers
...	...	...	...
H'0046'	Push button module address	H'0047'	Toggle push button 12 bit numbers
H'0048'	Push button module address	H'0049'	Dim push button 1 bit numbers
...	...	...	...
H'005E'	Push button module address	H'005F'	Dim push button 12 bit numbers
H'0060'	Slider module address	H'0061'	Slider 1 bit numbers
...	...	...	...
H'0076'	Slider module address	H'0077'	Slider 12 bit numbers
H'0078'	Push button module address	H'0079	Dim up push button 1 bit numbers
...	...	...	...
H'008E'	Push button module address	H'008F'	Dim up push button 12 bit numbers
H'0090'	Push button module address	H'0091'	Dim down push button 1 bit numbers
...	...	...	...
H'00A6'	Push button module address	H'00A7'	Dim down push button 12 bit numbers
H'00A8'	Push button module address	H'00A9'	Atmospheric push button 1 bit numbers
...	...	...	...
H'00BE'	Push button module address	H'00DF'	Atmospheric push button 12 bit numbers
H'00C0'	Atmospheric dimvalue 1	H'00C1'	Atmospheric dimvalue 2
...	...	...	...
H'00CA'	Atmospheric dimvalue 11	H'00CB'	Atmospheric dimvalue 12
H'00CC'	Atmospheric dimtime 1	H'00CD'	Atmospheric dimtime 2
...	...	...	...
H'00D6'	Atmospheric dimtime 11	H'00D7'	Atmospheric dimtime 12
H'00D8'	Unused	H'00D9'	Unused
H'00DA'	Unused	H'00DB'	Unused
H'00DC'	Unused	H'00DD'	Unused
H'00DE'	Unused	H'00DF'	Unused
H'00E0'	Local Dim push button name character 1	H'00E1'	Local Dim push button name character 2
...			
H'00EE'	Local Dim push button name character 15	H'00EF'	Local Dim push button name character 16
H'00F0'	Dimmer name character 1	H'00F1'	Dimmer name character 2
...			
H'00FE'	Dimmer name character 15	H'00FF'	Dimmer name character 16

Remark: Unused locations contain H'FF'
Atmospheric dimvalue: 0…100%
Atmospheric dimtime: bit 7 = 0 → time in seconds / bit 7 = 1 → time in minutes

Contents	*Mode*
B'00000000'	Fastest dimtime
B'00000001'	1 second
B'00000010'	2 seconds
...	...
B'01111110'	126 seconds
B'01111111'	Fastest dimtime
B'10000000'	Fastest dimtime
B'10000001'	1 minute
B'10000010'	2 minutes
...	...
B'11111110'	126 minutes
B'11111111'	Fastest dimtime