

# **VMB8PB**

**8 channel Push Button Interface  
module for VELBUS system**

## VELBUS protocol

Binary format:

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

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<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 1111111)
IFS3...IFS1	InterFrame Space (always 111)

**The push button module can transmit the following messages:**

- Push button status
- Module type
- Bus error counter status (Build 0649 or higher)
- Module status
- First, second and third part of the push button name
- Memory data
- Memory data block (4 bytes) (Build 0736 or higher)

**The push button module can receive the following commands:**

- Update LEDs
- Clear LEDs
- Set LEDs
- Blink LEDs slowly
- Blink LEDs fast
- Blink LEDs very fast
- Module type request
- Bus error counter status request (Build 0649 or higher)
- Module status request
- Push button name request
- Read memory data
- Memory dump request (Build 0736 or higher)
- Write memory data

**Transmits the push button 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 = 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)

**Transmits the module status:**

SID10-SID9 = 11 (lowest priority)  
SID8...SID1 = Address set by hex switches  
RTR = 0  
DLC3...DLC0 = 5 databytes to send  
DATABYTE1 = COMMAND\_MODULE\_STATUS (H'ED')  
DATABYTE2 = Input switches status (1 = closed)  
DATABYTE3 = LEDs continuous on status (1 = LED on)  
DATABYTE4 = LEDs slow blinking status (1 = LED slow blinking)  
DATABYTE5 = LEDs 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.

**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 = 8\_PUSH\_BUTTON\_MODULE\_TYPE (H'01')  
DATABYTE3 = LEDs continuous on status (1 = LED on)  
DATABYTE4 = LEDs slow blinking status (1 = LED slow blinking)  
DATABYTE5 = LEDs fast blinking status (1 = LED fast blinking)  
DATABYTE6 = Build year (Build 0649 or higher)  
DATABYTE7 = Build week (Build 0649 or higher)

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.

**Transmits the first part of the 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 bit number ('00000001' = Push button 1 / '10000000' = Push button 8)  
DATABYTE3 = Character 1 of the push button name  
DATABYTE4 = Character 2 of the push button name  
DATABYTE5 = Character 3 of the push button name  
DATABYTE6 = Character 4 of the push button name  
DATABYTE7 = Character 5 of the push button name  
DATABYTE8 = Character 6 of the push button name

**Transmits the second part of the 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 bit number ('00000001' = Push button 1 / '10000000' = Push button 8)  
DATABYTE3 = Character 7 of the push button name  
DATABYTE4 = Character 8 of the push button name  
DATABYTE5 = Character 9 of the push button name  
DATABYTE6 = Character 10 of the push button name  
DATABYTE7 = Character 11 of the push button name  
DATABYTE8 = Character 12 of the push button name

**Transmits the third part of the 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 bit number ('00000001' = Push button 1 / '10000000' = Push button 8)  
DATABYTE3 = Character 13 of the push button name  
DATABYTE4 = Character 14 of the push button name  
DATABYTE5 = Character 15 of the push button name  
DATABYTE6 = H'FF'

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'7F')  
DATABYTE4 = memory data

**Transmits memory data block (4 bytes) (Build 0736 or higher):**

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'FF')  
DATABYTE4 = memory data1  
DATABYTE5 = memory data2  
DATABYTE6 = memory data3  
DATABYTE7 = memory data4

**Transmit: Bus error counter status** (Build 0649 or higher)

SID10-SID9 = 11 (lowest priority)  
SID8...SID1 = Address set by hex switches  
RTR = 0  
DLC3...DLC0 = 4 databytes to send  
DATABYTE1 = COMMAND\_BUSERRORCOUNTER\_STATUS (H'DA')  
DATABYTE2 = Transmit error counter  
DATABYTE3 = Receive error counter  
DATABYTE4 = Bus off counter

**'Update LED status' command received:**

SID10-SID9 = 11 (lowest priority)  
SID8...SID1 = Address set by hex switches  
RTR = 0  
DLC3...DLC0 = 4 databytes received  
DATABYTE1 = COMMAND\_UPDATE\_LED\_STATUS (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.

**'Clear LED' command received:**

SID10-SID9 = 11 (lowest priority)  
SID8...SID1 = Address set by hex switches  
RTR = 0  
DLC3...DLC0 = 2 databytes received  
DATABYTE1 = COMMAND\_CLEAR\_LED (H'F5')  
DATABYTE2 = LEDs to clear (a one clears the corresponding LED)

**'Set LED' command received:**

SID10-SID9 = 11 (lowest priority)  
SID8...SID1 = Address set by hex switches  
RTR = 0  
DLC3...DLC0 = 2 databytes received  
DATABYTE1 = COMMAND\_SET\_LED (H'F6')  
DATABYTE2 = LEDs to set (a one sets the corresponding LED)

**'Slow blinking LED' command received:**

SID10-SID9 = 11 (lowest priority)  
SID8...SID1 = Address set by hex switches  
RTR = 0  
DLC3...DLC0 = 2 databytes received  
DATABYTE1 = COMMAND\_SLOW\_BLINKING\_LED (H'F7')  
DATABYTE2 = LEDs to blink slow (1 = slow blinking)

**'Fast blinking LED' command received:**

SID10-SID9 = 11 (lowest priority)  
SID8...SID1 = Address set by hex switches  
RTR = 0  
DLC3...DLC0 = 2 databytes received  
DATABYTE1 = COMMAND\_FAST\_BLINKING\_LED (H'F8')  
DATABYTE2 = LEDs to blink fast (1 = fast blinking)

**'Very fast blinking LED' command received:**

SID10-SID9 = 11 (lowest priority)  
SID8...SID1 = Address set by hex switches  
RTR = 0  
DLC3...DLC0 = 2 databytes received  
DATABYTE1 = COMMAND\_VERYFAST\_BLINKING\_LED (H'F9')  
DATABYTE2 = LEDs to clear (1 = very fast blinking)

**'Module 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\_MODULE\_STATUS\_REQUEST (H'FA')  
DATABYTE2 = Input channel bit numbers (B'11111111')

**'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:** (Build 0649 or higher)

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')

**'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\_PUSH\_BUTTON\_NAME\_REQUEST (H'EF')  
DATABYTE2 = Push button number (B'00000001' = Push button 1 ... B'10000000' = Push button 8)

**'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'7F')

**'Memory dump request' command received (Build 0736 or higher):**

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')

**'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'7F')  
DATABYTE4 = memory data to write

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

## Memory map:

<b>Address</b>	<b>Contents</b>	<b>Address</b>	<b>Contents</b>
H'0000'...H'000E'	Name of push button 1	H'000F'	Response time for push button 1
H'0010'...H'001E'	Name of push button 2	H'001F'	Response time for push button 2
H'0020'...H'002E'	Name of push button 3	H'002F'	Response time for push button 3
H'0030'...H'003E'	Name of push button 4	H'003F'	Response time for push button 4
H'0040'...H'004E'	Name of push button 5	H'004F'	Response time for push button 5
H'0050'...H'005E'	Name of push button 6	H'005F'	Response time for push button 6
H'0060'...H'006E'	Name of push button 7	H'006F'	Response time for push button 7
H'0070'...H'007E	Name of push button 8	H'007F'	Response time for push button 8

A maximum of 15 characters can be stored for every push button name. Unused characters contain H'FF'.

Valid response times are:

- H'05' : 65ms
- H'26' : 0.5s
- H'4C' : 1s
- H'99' : 2s
- H'E0' : 3s