

VMB4RY

**4 channel relay module for VELBUS
system**

Binary format:

<SOF-SID10...SID0-RTR-IDE-r0-DLC3...0-DATABYTE1...DATABYTE_n-CRC14...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
CRC14...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 relay 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 relay module can transmit the following messages:

- Relay status
- Push buttons & relays switch status (Build 0817 or higher)
- Module type
- Bus error counter status (Build 0647 or higher)
- First, second and third part of the relay name
- First, second and third part of the local mode push button names (Build 0817 or higher)
- Memory data
- Memory data block (4 bytes) (Build 0735 or higher)

The relay module can receive the following messages:

- Push button status

The relay module can receive the following commands:

- Switch relay off
- Switch relay on
- Start relay timer
- Start relay blinking timer
- Relay status request
- Clear Push button Led (Build 0811 or higher)
- Module type request
- Bus error counter status request (Build 0647 or higher)
- Relay and/or push button name request (Build 0817 or higher)
- Read memory data
- Read memory data block (4 bytes) (Build 0742 or higher)
- Memory dump request (Build 0735 or higher)

- Write memory data
- Write memory data block (4 bytes) (Build 0742 or higher)

Transmits the push button & relay switch status: (Build 0817 or higher)

SID10-SID9 = 00 (highest priority)

SID8...SID1 = Address set by hex switches

RTR = 0

DLC3...DLC0 = 4 databytes to send

DATA BYTE1 = COMMAND_PUSH_BUTTON_STATUS (H'00')

DATA BYTE2 = Local mode push buttons just pressed / relays just switched on (1 = just pressed / switched on)

DATA BYTE3 = Local mode push buttons just released / relays just switched off (1 = just released / switched off)

DATA BYTE4 = Local mode push buttons long pressed (1 = longer than 0.85s pressed)

	<i>Databyte2</i>	<i>Databyte3</i>	<i>Databyte4</i>
Relay channel 1 just switched on	B'xxxxxxx1'	B'xxxxxxx0'	B'xxxxxxx0'
Relay channel 1 just switched off	B'xxxxxxx0'	B'000x0001'	B'xxxxxxx0'
Local Mode Push button channel 1 just pressed	B'xx0xxxx'	B'xxx0xxxx'	B'xxx0xxxx'
Local Mode Push button channel 1 just long pressed	B'xx0xxxx'	B'xxx0xxxx'	B'xx0xxxx'
Local Mode Push button channel 1 just released	B'xx0xxxx'	B'xxx1xxxx'	B'xxx0xxxx'
Relay channel 2 just switched on	B'xxxxxx1x'	B'xxxxxx0x'	B'xxxxxx0x'
Relay channel 2 just switched off	B'xxxxxx0x'	B'xxxxxx1x'	B'xxxxxx0x'
Local Mode Push button channel 2 just pressed	B'xx1xxxx'	B'xx0xxxx'	B'xx0xxxx'
Local Mode Push button channel 2 just long pressed	B'xx0xxxx'	B'xx0xxxx'	B'xx1xxxx'
Local Mode Push button channel 2 just released	B'xx0xxxx'	B'xx1xxxx'	B'xx0xxxx'
Relay channel 3 just switched on	B'xxxx1xx'	B'xxxx0xx'	B'xxxx0xx'
Relay channel 3 just switched off	B'xxxx0xx'	B'xxxx1xx'	B'xxxx0xx'
Local Mode Push button channel 3 just pressed	B'x1xxxxx'	B'x0xxxxx'	B'x0xxxxx'
Local Mode Push button channel 3 just long pressed	B'x0xxxxx'	B'x0xxxxx'	B'x1xxxxx'
Local Mode Push button channel 3 just released	B'x0xxxxx'	B'x1xxxxx'	B'x0xxxxx'
Relay channel 4 just switched on	B'xxxx1xxx'	B'xxxx0xxx'	B'xxxx0xxx'
Relay channel 4 just switched off	B'xxxx0xxx'	B'xxxx1xxx'	B'xxxx0xxx'
Local Mode Push button channel 4 just pressed	B'1xxxxxx'	B'0xxxxxx'	B'0xxxxxx'
Local Mode Push button channel 4 just long pressed	B'0xxxxxx'	B'0xxxxxx'	B'1xxxxxx'
Local Mode Push button channel 4 just released	B'0xxxxxx'	B'1xxxxxx'	B'0xxxxxx'

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

DATA BYTE1 = COMMAND_UPDATE_LED (H'F4')

DATA BYTE2 = LED continuous on status (1 = LED on)

DATA BYTE3 = LED slow blinking status (1 = LED slow blinking)

DATA BYTE4 = 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

DATA BYTE1 = COMMAND_CLEAR_LED (H'F5')

DATA BYTE2 = 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)

Transmit: Bus error counter status (Build 0647 or higher)

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 relay status:

SID10-SID9 = 11 (lowest priority)

SID8...SID1 = Address set by hex switches

RTR = 0

DLC3...DLC0 = 8 databytes to send

DATABYTE1 = COMMAND_RELAY_STATUS (H'FB')

DATABYTE2 = Relay bit number

<i>Contents</i>	<i>Relay number</i>
B'00000001'	Channel 1
B'00000010'	Channel 2
B'00000100'	Channel 3
B'00001000'	Channel 4

DATABYTE3 = Mode setting

<i>Contents</i>	<i>Mode</i>
0	Start/stop timer
1	Staircase timer
2	Non-retriggerable timer
3	Turn-off delay
4	Turn-on delay
5	Timer triggered on release
6	Blinking timer
7	Dual timer

DATABYTE4 = Relay status

<i>Contents</i>	<i>Relay status</i>
B'00000000'	Relays off
B'00000001'	Relay channel 1 on
B'00000010'	Relay channel 2 on
B'00000100'	Relay channel 3 on
B'00001000'	Relay channel 4 on
B'00010001'	Relay channel 1 blinks
B'00100010'	Relay channel 2 blinks
B'01000100'	Relay channel 3 blinks
B'10001000'	Relay channel 4 blinks

DATABYTE5 = Led status

<i>Contents</i>	<i>Mode</i>
B'00000000'	LED off
B'10000000'	LED on
B'01000000'	LED slow blinking
B'00100000'	LED fast blinking
B'00010000'	LED very fast blinking

DATABYTE6 = high byte of current delay time

DATABYTE7 = mid byte of current delay time

DATABYTE8 = low byte of current delay time

Remark:

[DATABYTE6][DATABYTE7][DATABYTE8] 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 = 8 databytes to send

DATABYTE1 = COMMAND_MODULE_TYPE (H'FF')

DATABYTE2 = 4_CHANNEL_RELAY_MODULE_TYPE (H'08')

DATABYTE3 = Channel 1 hex switch setting (low nibble = Time1 / high nibble = Mode/Time2 setting)

DATABYTE4 = Channel 2 hex switch setting (low nibble = Time1 / high nibble = Mode/Time2 setting)

DATABYTE5 = Channel 3 hex switch setting (low nibble = Time1 / high nibble = Mode/Time2 setting)

DATABYTE6 = Channel 4 hex switch setting (low nibble = Time1 / high nibble = Mode/Time2 setting)

High nibble	Mode/Time2	Low nibble	Time2
0	Start/stop timer	0	Momentary
1	Staircase timer	1	5s
2	Non-retriggerable timer	2	10s
3	Turn-off delay	3	14s
4	Turn-on delay	4	30s
5	Timer triggered on release	5	1min
6	Blinking timer	6	2min
7	Dual timer (time 2 = 5min)	7	5min
8	Dual timer (time 2 = 10min)	8	10min
9	Dual timer (time 2 = 14min)	9	14min
A	Dual timer (time 2 = 30min)	A	30min
B	Dual timer (time 2 = 1h)	B	1h
C	Dual timer (time 2 = 2h)	C	2h
D	Dual timer (time 2 = 5h)	D	5h
E	Dual timer (time 2 = 1day)	E	1day
F	Dual timer (time 2 = on/off)	F	On/off

DATABYTE7 = Build year (Build 0647 or higher)

DATABYTE8 = Build week (Build 0647 or higher)

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

High address	Memory bank
H'00'	For channel 1 data
H'01'	For channel 2 data
H'02'	For channel 3 data
H'03'	For channel 4 data

DATABYTE3 = LOW memory address (H'00'...H'FF')

DATABYTE4 = memory data

Transmits memory data block (4 bytes) (Build 0735 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

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'03FC'

Transmits the first part of the relay name:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Address set by hex switches
RTR = 0
DLC3...DLC0 = 8 databytes to send
DATABYTE1 = COMMAND_RELAY_NAME_PART1 (H'F0')
DATABYTE2 = Relay bit number

<i>Contents</i>	<i>Relay number</i>
B'00000001'	Channel 1
B'00000010'	Channel 2
B'00000100'	Channel 3
B'00001000'	Channel 4

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

Transmits the second part of the relay name:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Address set by hex switches
RTR = 0
DLC3...DLC0 = 8 databytes to send
DATABYTE1 = COMMAND_RELAY_NAME_PART2 (H'F1')
DATABYTE2 = Relay bit number

<i>Contents</i>	<i>Relay number</i>
B'00000001'	Channel 1
B'00000010'	Channel 2
B'00000100'	Channel 3
B'00001000'	Channel 4

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

Transmits the third part of the relay name:

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Address set by hex switches
RTR = 0
DLC3...DLC0 = 6 databytes to send
DATABYTE1 = COMMAND_RELAY_NAME_PART3 (H'F2')
DATABYTE2 = Relay bit number

<i>Contents</i>	<i>Relay number</i>
B'00000001'	Channel 1
B'00000010'	Channel 2
B'00000100'	Channel 3
B'00001000'	Channel 4

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

Remarks:

Unused characters contain H'FF'.

Transmits the first part of the local mode push button name: (Build 0817 or higher)

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

<i>Contents</i>	<i>Push button number</i>
B'00010000'	Channel 1
B'00100000'	Channel 2
B'01000000'	Channel 3
B'10000000'	Channel 4

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 local mode push button name: (Build 0817 or higher)

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

<i>Contents</i>	<i>Push button number</i>
B'00010000'	Channel 1
B'00100000'	Channel 2
B'01000000'	Channel 3
B'10000000'	Channel 4

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 local mode push button name: (Build 0817 or higher)

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

<i>Contents</i>	<i>Push button number</i>
B'00010000'	Channel 1
B'00100000'	Channel 2
B'01000000'	Channel 3
B'10000000'	Channel 4

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'.

'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)

'Clear LED' command received (Build 0811 or higher):

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)

'Switch relay off' command received:

SID10-SID9 = 00 (highest priority)
SID8...SID1 = Address set by hex switches
RTR = 0
DLC3...DLC0 = 2 databytes received
DATABYTE1 = COMMAND_SWITCH_RELAY_OFF (H'01')
DATABYTE2 = Relay bit number

<i>Contents</i>	<i>Relay number</i>
B'00000001'	Channel 1
B'00000010'	Channel 2
B'00000100'	Channel 3
B'00001000'	Channel 4

'Switch relay on' command received:

SID10-SID9 = 00 (highest priority)
SID8...SID1 = Address set by hex switches
RTR = 0
DLC3...DLC0 = 2 databytes received
DATABYTE1 = COMMAND_SWITCH_RELAY_ON (H'02')
DATABYTE2 = Relay bit number

<i>Contents</i>	<i>Relay number</i>
B'00000001'	Channel 1
B'00000010'	Channel 2
B'00000100'	Channel 3
B'00001000'	Channel 4

'Start relay 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_RELAY_TIMER (H'03')
DATABYTE2 = Relay bit number

<i>Contents</i>	<i>Relay number</i>
B'00000001'	Channel 1
B'00000010'	Channel 2
B'00000100'	Channel 3
B'00001000'	Channel 4

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

If the time parameter contains zero then the timer starts for a time set by the hex switches on the relay module. If the hex switches are set at momentary mode there will be no action. If the hex switches are set at toggle mode, the relay switches permanently on.

If the time parameter contains H'FFFFFF' then the relay switches permanently on.

'Start relay blinking 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_BLINK_RELAY_TIMER (H'0D')
DATABYTE2 = Relay bit number

<i>Contents</i>	<i>Relay number</i>
B'00000001'	Channel 1
B'00000010'	Channel 2
B'00000100'	Channel 3
B'00001000'	Channel 4

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

If the time parameter contains zero then the timer starts for a time set by the hex switches on the relay module. If the hex switches are set at momentary mode there will be no action. If the hex switches are set at toggle mode, the relay switches permanently on.

If the time parameter contains H'FFFFFF' then the relay switches permanently on.

'Relay 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_RELAY_STATUS_REQUEST (H'FA')
DATABYTE2 = Relay bit number

<i>Contents</i>	<i>Relay number</i>
B'00000001'	Channel 1
B'00000010'	Channel 2
B'00000100'	Channel 3
B'00001000'	Channel 4

'Module type request' command received:

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

'Relay and/or push button name request' command received (Build 0817 or higher):

SID10-SID9 = 11 (lowest priority)
SID8...SID1 = Address set by hex switches
RTR = 0
DLC3...DLC0 = 2 databytes received
DATABYTE1 = COMMAND_RELAY_NAME_REQUEST (H'EF')
DATABYTE2 = Relay bit number

<i>Contents</i>	<i>channel number</i>
B'00000001'	Relay Channel 1
B'00000010'	Relay Channel 2
B'00000100'	Relay Channel 3
B'00001000'	Relay Channel 4
B'00010000'	Push button Channel 1
B'00100000'	Push button Channel 2
B'01000000'	Push button Channel 3
B'10000000'	Push button Channel 4

'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

<i>High address</i>	<i>Memory bank</i>
H'00'	For channel 1 data
H'01'	For channel 2 data
H'02'	For channel 3 data
H'03'	For channel 4 data

DATABYTE3 = LOW memory address (H'00'...H'FF')

'Read data block from memory' command received: (Build 0742 or higher)

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
DATABYTE3 = LOW memory address

Remark: Valid address range: H'0000' to H'03FC'

'Memory dump request' command received (Build 0735 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

<i>High address</i>	<i>Memory bank</i>
H'00'	For channel 1 data
H'01'	For channel 2 data
H'02'	For channel 3 data
H'03'	For channel 4 data

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: (Build 0742 or higher)

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

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:

Valid address range: H'0000' to H'03FC'

Wait for 'memory data block' feedback before sending a next command on the velbus.

'Bus error counter status request' command received: (Build 0647 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_COUNTER_STATUS_REQUEST (H'D9')

Memory map Build 0812 or lower:

<i>Address</i>	<i>Contents</i>	<i>Address</i>	<i>Contents</i>
H'0000'	Push button module address	H'0001'	Clear push button 1 bit numbers for channel 1
...
H'001C'	Push button module address	H'001D'	Clear push button 15 bit numbers for channel 1
H'001E'	Push button module address	H'001F'	Set push button 1 bit numbers for channel 1
...
H'003A'	Push button module address	H'003B'	Set push button 15 bit numbers for channel 1
H'003C'	Push button module address	H'003D'	Toggle push button 1 bit numbers for channel 1
...
H'0058'	Push button module address	H'0059'	Toggle push button 15 bit numbers for channel 1
H'005A'	Push button module address	H'005B'	Activate mode push button 1 bit numbers for channel 1
...
H'0076'	Push button module address	H'0077'	Activate mode push button 15 bit numbers for channel 1
H'0078'	Push button module address	H'0079'	Toggle timer1 push button 1 bit numbers for channel 1
...
H'0094'	Push button module address	H'0095'	Toggle timer1 push button 15 bit numbers for channel 1
H'0096'	Push button module address	H'0097'	Toggle timer2 push button 1 bit numbers for channel 1
...
H'00B2'	Push button module address	H'00B3'	Toggle timer2 push button 15 bit numbers for channel 1
H'00B4'	Push button module address	H'00B5'	Start timer1 push button 1 bit numbers for channel 1
...
H'00D0'	Push button module address	H'00D1'	Start timer1 push button 15 bit numbers for channel 1
H'00D2'	Push button module address	H'00D3'	Start timer2 push button 1 bit numbers for channel 1
...
H'00EE'	Push button module address	H'00EF'	Start timer2 push button 15 bit numbers for channel 1
H'00F0'	Relay channel 1 name character 1	H'00F1'	Relay channel 1 name character 2
...
H'00FE'	Relay channel 1 name character 15	H'00FF'	Relay channel 1 name character 16

<i>Address</i>	<i>Contents</i>	<i>Address</i>	<i>Contents</i>
H'0100'	Push button module address	H'0101'	Clear push button 1 bit numbers for channel 2
...
H'011C'	Push button module address	H'011D'	Clear push button 15 bit numbers for channel 2
H'011E'	Push button module address	H'011F'	Set push button 1 bit numbers for channel 2
...
H'013A'	Push button module address	H'013B'	Set push button 15 bit numbers for channel 2
H'013C'	Push button module address	H'013D'	Toggle push button 1 bit numbers for channel 2
...
H'0148'	Push button module address	H'0149'	Toggle push button 15 bit numbers for channel 2
H'014A'	Push button module address	H'005B'	Activate mode push button 1 bit numbers for channel 2
...
H'0176'	Push button module address	H'0077'	Activate mode push button 15 bit numbers for channel 2
H'0178'	Push button module address	H'0179'	Toggle timer1 push button 1 bit numbers for channel 2
...
H'0194'	Push button module address	H'0195'	Toggle timer1 push button 15 bit numbers for channel 2
H'0196'	Push button module address	H'0197'	Toggle timer2 push button 1 bit numbers for channel 2
...
H'01B2'	Push button module address	H'01B3'	Toggle timer2 push button 15 bit numbers for channel 2
H'01B4'	Push button module address	H'01B5'	Start timer1 push button 1 bit numbers for channel 2
...
H'01D0'	Push button module address	H'01D1'	Start timer1 push button 15 bit numbers for channel 2
H'01D2'	Push button module address	H'01D3'	Start timer2 push button 1 bit numbers for channel 2
...
H'01EE'	Push button module address	H'01EF'	Start timer2 push button 15 bit numbers for channel 2
H'01F0'	Relay channel 2 name character 1	H'01F1'	Relay channel 2 name character 2
...
H'01FE'	Relay channel 2 name character 15	H'01FF'	Relay channel 2 name character 16

<i>Address</i>	<i>Contents</i>	<i>Address</i>	<i>Contents</i>
H'0200'	Push button module address	H'0201'	Clear push button 1 bit numbers for channel 3
...
H'021C'	Push button module address	H'021D'	Clear push button 15 bit numbers for channel 3
H'021E'	Push button module address	H'022F'	Set push button 1 bit numbers for channel 3
...
H'023A'	Push button module address	H'023B'	Set push button 15 bit numbers for channel 3
H'023C'	Push button module address	H'023D'	Toggle push button 1 bit numbers for channel 3
...
H'0258'	Push button module address	H'0259'	Toggle push button 15 bit numbers for channel 3
H'025A'	Push button module address	H'005B'	Activate mode push button 1 bit numbers for channel 3
...
H'0276'	Push button module address	H'0077'	Activate mode push button 15 bit numbers for channel 3
H'0278'	Push button module address	H'0279'	Toggle timer1 push button 1 bit numbers for channel 3
...
H'0294'	Push button module address	H'0295'	Toggle timer1 push button 15 bit numbers for channel 3
H'0296'	Push button module address	H'0297'	Toggle timer2 push button 1 bit numbers for channel 3
...
H'02B2'	Push button module address	H'02B3'	Toggle timer2 push button 15 bit numbers for channel 3
H'02B4'	Push button module address	H'02B5'	Start timer1 push button 1 bit numbers for channel 3
...
H'02D0'	Push button module address	H'02D1'	Start timer1 push button 15 bit numbers for channel 3
H'02D2'	Push button module address	H'02D3'	Start timer2 push button 1 bit numbers for channel 3
...
H'02EE'	Push button module address	H'02EF'	Start timer2 push button 15 bit numbers for channel 3
H'02F0'	Relay channel 3 name character 1	H'02F1'	Relay channel 3 name character 2
...
H'02FE'	Relay channel 3 name character 15	H'02FF'	Relay channel 3 name character 16

<i>Address</i>	<i>Contents</i>	<i>Address</i>	<i>Contents</i>
H'0300'	Push button module address	H'0301'	Clear push button 1 bit numbers for channel 4
...
H'031C'	Push button module address	H'031D'	Clear push button 15 bit numbers for channel 4
H'031E'	Push button module address	H'031F'	Set Push button 1 bit numbers for channel 4
...
H'033A'	Push button module address	H'033B'	Set push button 15 bit numbers for channel 4
H'034C'	Push button module address	H'034D'	Toggle push button 1 bit numbers for channel 4
...
H'0358'	Push button module address	H'0359'	Toggle push button 15 bit numbers for channel 4
H'035A'	Push button module address	H'005B'	Activate mode push button 1 bit numbers for channel 4
...
H'0376'	Push button module address	H'0077'	Activate mode push button 15 bit numbers for channel 4
H'0378'	Push button module address	H'0379'	Toggle timer1 push button 1 bit numbers for channel 4
...
H'0394'	Push button module address	H'0395'	Toggle timer1 push button 15 bit numbers for channel 4
H'0396'	Push button module address	H'0397'	Toggle timer2 push button 1 bit numbers for channel 4
...
H'03B2'	Push button module address	H'03B3'	Toggle timer2 push button 15 bit numbers for channel 4
H'03B4'	Push button module address	H'03B5'	Start timer1 push button 1 bit numbers for channel 4
...
H'03D0'	Push button module address	H'03D1'	Start timer1 push button 15 bit numbers for channel 4
H'03D2'	Push button module address	H'03D3'	Start timer2 push button 1 bit numbers for channel 4
...
H'03EE'	Push button module address	H'03EF'	Start timer2 push button 15 bit numbers for channel 4
H'03F0'	Relay channel 4 name character 1	H'03F1'	Relay channel 4 name character 2
...
H'03FE'	Relay channel 4 name character 15	H'03FF'	Relay channel 4 name character 16

Remark:
Unused locations contain H'FF'

Memory map Build 0817 or higher:

<i>Address</i>	<i>Contents</i>	<i>Address</i>	<i>Contents</i>
H'0000'	Push button module address	H'0001'	Clear push button 1 bit numbers for channel 1
...
H'001A'	Push button module address	H'001B'	Clear push button 14 bit numbers for channel 1
H'001C'	Push button module address	H'001D'	Set push button 1 bit numbers for channel 1
...
H'0036'	Push button module address	H'0037'	Set push button 14 bit numbers for channel 1
H'0038'	Push button module address	H'0039'	Toggle push button 1 bit numbers for channel 1
...
H'0052'	Push button module address	H'0053'	Toggle push button 14 bit numbers for channel 1
H'0054'	Push button module address	H'0055'	Activate mode push button 1 bit numbers for channel 1
...
H'006E'	Push button module address	H'006F'	Activate mode push button 14 bit numbers for channel 1
H'0070'	Push button module address	H'0071'	Toggle timer1 push button 1 bit numbers for channel 1
...
H'008A'	Push button module address	H'008B'	Toggle timer1 push button 14 bit numbers for channel 1
H'008C'	Push button module address	H'008D'	Toggle timer2 push button 1 bit numbers for channel 1
...
H'00A6'	Push button module address	H'00A7'	Toggle timer2 push button 14 bit numbers for channel 1
H'00A8'	Push button module address	H'00A9'	Start timer1 push button 1 bit numbers for channel 1
...
H'00C2'	Push button module address	H'00C3'	Start timer1 push button 14 bit numbers for channel 1
H'00C4'	Push button module address	H'00C5'	Start timer2 push button 1 bit numbers for channel 1
...
H'00DE'	Push button module address	H'00DF'	Start timer2 push button 14 bit numbers for channel 1
H'00E0'	Local Push button channel 1 name character 1	H'00E1'	Push button channel 1 name character 2
...
H'00EE'	Local Push button channel 1 name character 15	H'00EF'	Push button channel 1 response time
H'00F0'	Relay channel 1 name character 1	H'00F1'	Relay channel 1 name character 2
...
H'00FE'	Relay channel 1 name character 15	H'00FF'	Relay channel 1 name character 16

<i>Address</i>	<i>Contents</i>	<i>Address</i>	<i>Contents</i>
H'0100'	Push button module address	H'0101'	Clear push button 1 bit numbers for channel 2
...
H'0118'	Push button module address	H'0119'	Clear push button 14 bit numbers for channel 2
H'011A'	Push button module address	H'011B'	Set push button 1 bit numbers for channel 2
...
H'0136'	Push button module address	H'0137'	Set push button 14 bit numbers for channel 2
H'0138'	Push button module address	H'0139'	Toggle push button 1 bit numbers for channel 2
...
H'0152'	Push button module address	H'0153'	Toggle push button 14 bit numbers for channel 2
H'0154'	Push button module address	H'0055'	Activate mode push button 1 bit numbers for channel 2
...
H'016E'	Push button module address	H'006F'	Activate mode push button 14 bit numbers for channel 2
H'0170'	Push button module address	H'0171'	Toggle timer1 push button 1 bit numbers for channel 2
...
H'018A'	Push button module address	H'018B'	Toggle timer1 push button 14 bit numbers for channel 2
H'018C'	Push button module address	H'018D'	Toggle timer2 push button 1 bit numbers for channel 2
...
H'01A6'	Push button module address	H'01A7'	Toggle timer2 push button 14 bit numbers for channel 2
H'01A8'	Push button module address	H'01A9'	Start timer1 push button 1 bit numbers for channel 2
...
H'01C2'	Push button module address	H'01C3'	Start timer1 push button 14 bit numbers for channel 2
H'01C4'	Push button module address	H'01C4'	Start timer2 push button 1 bit numbers for channel 2
...
H'01DE'	Push button module address	H'01DF'	Start timer2 push button 14 bit numbers for channel 2
H'01E0'	Local Push button channel 2 name character 1	H'01E1'	Push button channel 2 name character 2
...
H'01EE'	Local Push button channel 2 name character 15	H'01EF'	Push button channel 2 response time
H'01F0'	Relay channel 2 name character 1	H'01F1'	Relay channel 2 name character 2
...
H'01FE'	Relay channel 2 name character 15	H'01FF'	Relay channel 2 name character 16

<i>Address</i>	<i>Contents</i>	<i>Address</i>	<i>Contents</i>
H'0200'	Push button module address	H'0201'	Clear push button 1 bit numbers for channel 3
...
H'021A'	Push button module address	H'021B'	Clear push button 14 bit numbers for channel 3
H'021C'	Push button module address	H'022D'	Set push button 1 bit numbers for channel 3
...
H'0236'	Push button module address	H'0237'	Set push button 14 bit numbers for channel 3
H'0238'	Push button module address	H'0239'	Toggle push button 1 bit numbers for channel 3
...
H'0252'	Push button module address	H'0253'	Toggle push button 14 bit numbers for channel 3
H'0254'	Push button module address	H'0055'	Activate mode push button 1 bit numbers for channel 3
...
H'026E'	Push button module address	H'006F'	Activate mode push button 14 bit numbers for channel 3
H'0270'	Push button module address	H'0271'	Toggle timer1 push button 1 bit numbers for channel 3
...
H'028A'	Push button module address	H'028B'	Toggle timer1 push button 14 bit numbers for channel 3
H'028C'	Push button module address	H'028D'	Toggle timer2 push button 1 bit numbers for channel 3
...
H'02A6'	Push button module address	H'02A7'	Toggle timer2 push button 14 bit numbers for channel 3
H'02A8'	Push button module address	H'02A9'	Start timer1 push button 1 bit numbers for channel 3
...
H'02C2'	Push button module address	H'02C3'	Start timer1 push button 14 bit numbers for channel 3
H'02C4'	Push button module address	H'02C5'	Start timer2 push button 1 bit numbers for channel 3
...
H'02DE'	Push button module address	H'02DF'	Start timer2 push button 14 bit numbers for channel 3
H'02E0'	Local Push button channel 3 name character 1	H'02E1'	Push button channel 3 name character 2
...
H'02EE'	Local Push button channel 3 name character 15	H'02EF'	Push button channel 3 response time
H'02F0'	Relay channel 3 name character 1	H'02F1'	Relay channel 3 name character 2
...
H'02FE'	Relay channel 3 name character 15	H'02FF'	Relay channel 3 name character 16

<i>Address</i>	<i>Contents</i>	<i>Address</i>	<i>Contents</i>
H'0300'	Push button module address	H'0301'	Clear push button 1 bit numbers for channel 4
...
H'031A'	Push button module address	H'031B'	Clear push button 14 bit numbers for channel 4
H'031C'	Push button module address	H'031D'	Set Push button 1 bit numbers for channel 4
...
H'0336'	Push button module address	H'0337'	Set push button 14 bit numbers for channel 4
H'0338'	Push button module address	H'0339'	Toggle push button 1 bit numbers for channel 4
...
H'0352'	Push button module address	H'0353'	Toggle push button 14 bit numbers for channel 4
H'0354'	Push button module address	H'0055'	Activate mode push button 1 bit numbers for channel 4
...
H'036E'	Push button module address	H'006F'	Activate mode push button 14 bit numbers for channel 4
H'0370'	Push button module address	H'0371'	Toggle timer1 push button 1 bit numbers for channel 4
...
H'038A'	Push button module address	H'038B'	Toggle timer1 push button 14 bit numbers for channel 4
H'038C'	Push button module address	H'038D'	Toggle timer2 push button 1 bit numbers for channel 4
...
H'03A6'	Push button module address	H'03A7'	Toggle timer2 push button 14 bit numbers for channel 4
H'03A8'	Push button module address	H'03A9'	Start timer1 push button 1 bit numbers for channel 4
...
H'03C2'	Push button module address	H'03C3'	Start timer1 push button 14 bit numbers for channel 4
H'03C4'	Push button module address	H'03C5'	Start timer2 push button 1 bit numbers for channel 4
...
H'03DE'	Push button module address	H'03DF'	Start timer2 push button 14 bit numbers for channel 4
H'03E0'	Local Push button channel 4 name character 1	H'03E1'	Push button channel 4 name character 2
...
H'03EE'	Local Push button channel 4 name character 15	H'03EF'	Push button channel 4 response time
H'03F0'	Relay channel 4 name character 1	H'03F1'	Relay channel 4 name character 2
...
H'03FE'	Relay channel 4 name character 15	H'03FF'	Relay channel 4 name character 16

Remark: Unused locations contain H'FF'