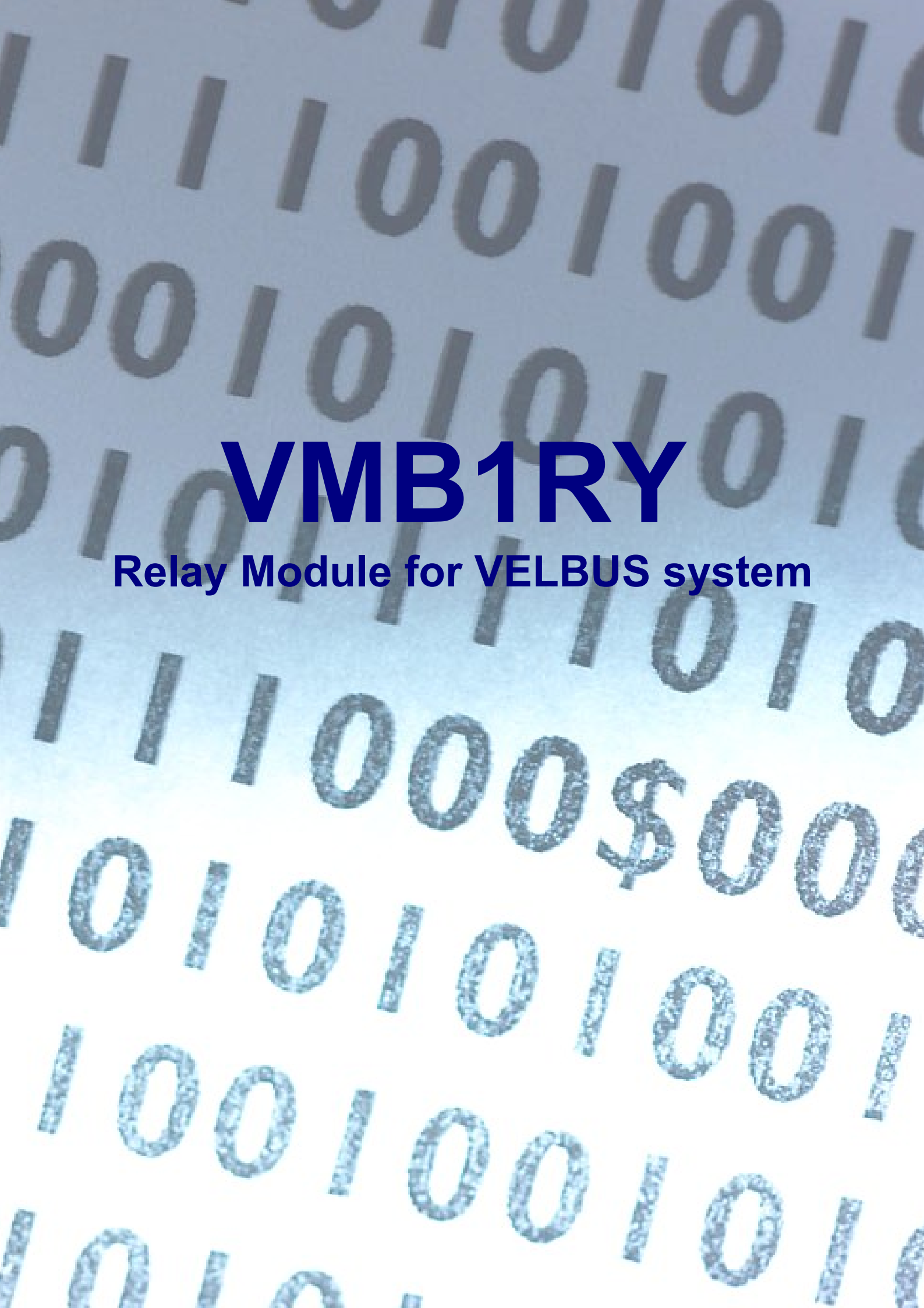

VMB1RY

Relay 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 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 button & relay switch status (Build 0814 or higher)
- Module type
- Bus error counter status (Build 0648 or higher)
- First, second and third part of the relay name
- First, second and third part of the local mode push button name (Build 0814 or higher)
- Memory data
- Memory data block (4 bytes) (Build 0736 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 0814 or higher)
- Module type request
- Bus error counter status request (Build 0648 or higher)
- Relay and/or push button name request (Build 0814 or higher)
- Read memory data
- Memory dump request (Build 0736 or higher)
- Write memory data

Transmits the push button & relay switch status: (Build 0814 or higher)

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 mode push button just pressed / relay just switched on (1 = just pressed / switched on)
DATABYTE3 = Local mode push button just released / relay just switched off (1 = just released / switched off)
DATABYTE4 = Local mode push button long pressed (1 = longer than 0.85s pressed)

	Databyte2	***Databyte3***	***Databyte4***
Relay just switched on	B'000x0001'	B'000x0000'	B'000x0000'
Relay just switched off	B'000x0000'	B'000x0001'	B'000x0000'
Local Mode Push button just pressed	B'0001000x'	B'0000000x'	B'0000000x'
Local Mode Push button just long pressed	B'0000000x'	B'0000000x'	B'0001000x'
Local Mode Push button just released	B'0000000x'	B'0001000x'	B'0000000x'

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 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 (B'00000001')
DATABYTE3 = Mode setting

Contents	*Mode*
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 (B'00000000' = off / B'00000001' = on / B'00010001' = blink)
DATABYTE5 = 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

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 = 5 databytes to send
DATABYTE1 = COMMAND_MODULE_TYPE (H'FF')
DATABYTE2 = ONE_CHANNEL_RELAY_MODULE_TYPE (H'02')
DATABYTE3 = hex switch setting (low nibble = Time1 setting / 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	15s
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 = 15min)	9	15min
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

DATABYTE4 = Build year (Build 0648 or higher)
DATABYTE5 = Build week (Build 0648 or higher)

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 (B'00000001')
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 (B'00000001')
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 (B'00000001')
DATABYTE3 = Character 13 of the relay name
DATABYTE4 = Character 14 of the relay name
DATABYTE5 = Character 15 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 0814 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 (B'00010000')
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 0814 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 (B'00010000')
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 0814 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 (B'00010000')
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'.

Transmit: Bus error counter status: (Build 0648 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 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

'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 0814 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 (B'00000001')

'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 (B'00000001')

'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 (B'00000001')
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 (B'00000001')
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 (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: (Build 0648 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')

'Relay and/or push button name request' command received (Build 0814 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 and/or push button bit number (B'00000001' : relay identifier)
(B'00010000' : 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'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 Build 0736 or lower:

Address	*Contents*	*Address*	*Contents*
H'0000'	Push button module address	H'0001'	Clear push button 1 bit numbers
...	...	...	...
H'000C'	Push button module address	H'000D'	Clear push button 7 bit numbers
H'000E'	Push button module address	H'000F'	Set push button 1 bit numbers
...	...	...	...
H'001A'	Push button module address	H'001B'	Set push button 7 bit numbers
H'001C'	Push button module address	H'001D'	Toggle push button 1 bit numbers
...	...	...	...
H'0028'	Push button module address	H'0029'	Toggle push button 7 bit numbers
H'002A'	Push button module address	H'002B'	Activate mode push button 1 bit numbers
...	...	...	...
H'0036'	Push button module address	H'0037'	Activate mode push button 7 bit numbers
H'0038'	Push button module address	H'0039'	Toggle timer1 push button 1 bit numbers
...	...	...	...
H'0044'	Push button module address	H'0045'	Toggle timer1 push button 7 bit numbers
H'0046'	Push button module address	H'0047'	Toggle timer2 push button 1 bit numbers
...	...	...	...
H'0052'	Push button module address	H'0053'	Toggle timer2 push button 7 bit numbers
H'0054'	Push button module address	H'0055'	Start timer1 push button 1 bit numbers
...	...	...	...
H'0060'	Push button module address	H'0061'	Start timer1 push button 7 bit numbers
H'0062'	Push button module address	H'0063'	Start timer2 push button 1 bit numbers
...	...	...	...
H'006E'	Push button module address	H'006F'	Start timer2 push button 7 bit numbers
H'0070'	Relay name character 1	H'0071'	Relay name character 2
...	...	...	...
H'007E'	Relay name character 15	H'007F'	Relay name character 16

Remark: Unused locations contain H'FF'

Memory map Build 0814 or higher:

Address	*Contents*	*Address*	*Contents*
H'0000'	Push button module address	H'0001'	Clear push button 1 bit numbers
...	...	...	...
H'000A'	Push button module address	H'000B'	Clear push button 6 bit numbers
H'000C'	Push button module address	H'000D'	Set push button 1 bit numbers
...	...	...	...
H'0016'	Push button module address	H'0017'	Set push button 6 bit numbers
H'0018'	Push button module address	H'0019'	Toggle push button 1 bit numbers
...	...	...	...
H'0022'	Push button module address	H'0023'	Toggle push button 6 bit numbers
H'0024'	Push button module address	H'0025'	Activate mode push button 1 bit numbers
...	...	...	...
H'002E'	Push button module address	H'002F'	Activate mode push button 6 bit numbers
H'0030'	Push button module address	H'0031'	Toggle timer1 push button 1 bit numbers
...	...	...	...
H'003A'	Push button module address	H'003B'	Toggle timer1 push button 6 bit numbers
H'003C'	Push button module address	H'003D'	Toggle timer2 push button 1 bit numbers
...	...	...	...
H'0046'	Push button module address	H'0047'	Toggle timer2 push button 6 bit numbers
H'0048'	Push button module address	H'0049'	Start timer1 push button 1 bit numbers
...	...	...	...
H'0052'	Push button module address	H'0053'	Start timer1 push button 6 bit numbers
H'0054'	Push button module address	H'0055'	Start timer2 push button 1 bit numbers
...	...	...	...
H'005E'	Push button module address	H'005F'	Start timer2 push button 6 bit numbers
H'0060'	Push button name character 1	H'0061'	Push button name character 2
...	...	...	...
H'006E'	Push button name character 15	H'006F'	Push button response time
H'0070'	Relay name character 1	H'0071'	Relay name character 2
...	...	...	...
H'007E'	Relay name character 15	H'007F'	Relay name character 16

Remark: Unused locations contain H'FF'
Valid push button response times are:

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