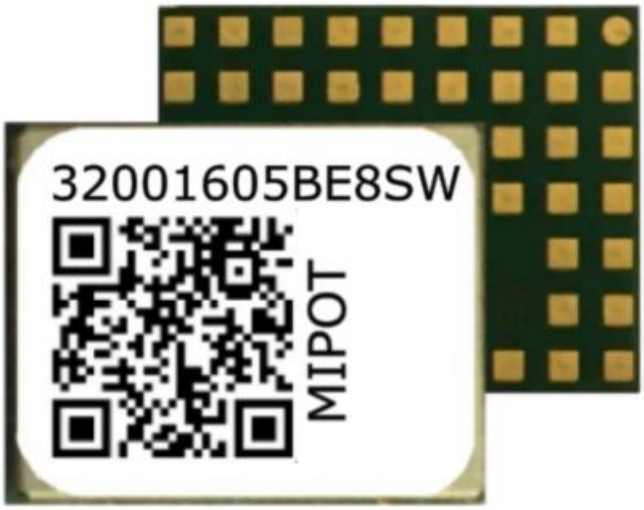
Wireless Protocol Modules

Wireless M-Bus Module

Command Reference



Description

The document provides the list of commands that the wM-Bus module implements and the description of their use.

Contents

1. Abbreviations

SCM	Single Core Module
DCM	Dual Core Module

2. Definitions

- Single Core Module: host based module needing an external microcontroller to configure and operate it.
- Dual Core Module: dual core microcontroller in which one is dedicated to the radio stack and the other one is free for the customer application firmware.

3. Communication protocol

3.1. Byte Order

Multiple byte values are transmitted in little endian order with least significant byte first (LSB).

3.2. Message Structure

The structure of the messages is the following:

HEADER	CMD	LENGTH	PAYLOAD (n Bytes)	CHECKSUM

Where:

HEADER = 0xAA

CMD = Command code to the module (to the *SCM*) / to the radio stack (to the *DCM*) , see the following table

LENGTH = Payload length

CHECKSUM = 2's complement on one byte of the sum of all preceding bytes

Each command from the host invokes an answer from the module (*SCM*)/from the radio stack (*DCM*) in the same format.

The answer to the host has the CMD field equal to host request OR 0x80.

3.3. Message Types

There are three types of messages:

Commands: sent from the host to the module to request an information or an action (*SCM* case).

sent from the user application running on the M4 core to the radio stack running on the M0+ core to request an information or an action (*DCM* case).

Replies: sent from the module to the host as direct reply to a command, their command code is equal to the host request (<cmd> OR 0x80) (*SCM* case).

sent from the radio stack to the user application as direct reply to a command, their command code is equal to the host request (<cmd> OR 0x80) (*DCM* case).

Indications: messages sent from the module to the host that are sent without prior action from the host, triggered by events on the radio interface. (e.g.: a received transmission) (*SCM* case).

messages sent from the radio stack to the user application that are sent without prior action from the host, triggered by events on the radio interface. (E.g.: a received transmission) (*DCM* case).

4. Command Set Description

List of the implemented command:

Command (CMD)	Value	Description
GET_TEMPERATURE_CMD*	0x2C	Get Chip Temperature
RESET_CMD	0x30	Module Software Reset
FACTORY_RESET_CMD	0x31	Restore EEPROM to factory default values
EEPROM_WRITE_CMD	0x32	Write EEPROM parameter
EEPROM_READ_CMD	0x33	Read EEPROM parameter
GET_FW_VERSION_CMD	0x34	Get Firmware Version
GET_SERIALNO_CMD	0x35	Get Serial Number stored in module
GET_RSSI_CMD	0x39	Get last RSSI value
LSE_CALIBRATION_CMD*	0x3C	Calibrate LSE oscillator
SET_MODE_CMD	0x40	Change WM-Bus mode
SET_C_FIELD_CMD	0x41	Set C-Field WM-Bus value
TX_MSG_CMD	0x50	Transmission of WM-Bus message
RX_MSG_IND	0x53	Indicate reception of WM-Bus message
TX_SYNC_MSG_CMD*	0x5A	Configure and send synchronous message

(*) *For newer FW versions only*

4.1. GET_TEMPERATURE_CMD (0x2C)

Get chip temperature (approximate).

Host: 0xAA, 0x2C, 0x00, 0x2A

Reply: 0xAA, 0xAC, 0x03, Status, TEMP0, TEMP1, cks

Status: 0x00: Success

0xFF: Fail

TEMPn: Chip temperature [0.1°C]

Note[1]: this command is supported in the following FW versions and higher:

32001505Axx	0x03000006 (EU) | 0x03010006 (US)
32001506Axx	0x03800005 (EU) | 0x03810005 (US)
32001605BE8SW	0x10610000 (EU)

Note[2]: this command performs automatically the calibration of the high speed external oscillator HSE.

4.2. RESET_CMD (0x30)

This command performs a module Reset.

When a valid reset request is received, the module replies immediately to the host microcontroller.

All communication interfaces will be disabled during the reset procedure.

Host: 0xAA, 0x30, 0x00, 0x26

Reply: 0xAA, 0xB0, 0x00, 0xA6

4.3. FACTORY_RESET_CMD (0x31)

This command performs the recovery of EEPROM default values. This command is allowed only when the module is in idle state.

Host: 0xAA, 0x31, 0x00, 0x25

Reply: 0xAA, 0xB1, 0x01, Status, cks

Status: 0x00: Success

0xFF: Fail

4.4. EEPROM_WRITE_CMD (0x32)

This command performs an EEPROM data write. For Addresses and Data values see “Module Configuration” section.

Host: 0xAA, 0x32, Length, Start Address, <Data>, checksum

Reply: 0xAA, 0xB2, 0x01, EEWriteStatus, checksum

EEWriteStatus: 0x00: Success

0x01: Invalid address

Note: Data outside allowed range will not be stored in EEPROM and the current value will not be modified.

4.5. EEPROM_READ_CMD (0x33)

This command performs the EEPROM data read. For Address and Data table see Module Configuration section.

Host: 0xAA, 0x33, 0x02, Start Address, Number of bytes, cks

Reply: 0xAA, 0xB3, Length, Status, Data, cks

Status: 0x00: Success, Data contains EEPROM values

0xFF: Fail, Data is empty and Length is equal to 1

4.6. GET_FW_VERSION_CMD (0x34)

Get 32bit firmware version.

Host: 0xAA, 0x34, 0x00, 0x22

Reply: 0xAA, 0xB4, 0x04, FWV0, FWV1, FWV2, FWV3, cks

FWVn: FW version

4.7. GET_SERIALNO_CMD (0x35)

Get Mipot 32bit Serial Number.

Host: 0xAA, 0x35, 0x00, 0x21

Reply: 0xAA, 0xB5, 0x04, SN0, SN1, SN2, SN3, cks

SNn: Serial number

4.8. GET_RSSI_CMD (0x39)

Host: 0xAA, 0x39, 0x00, 0x1D

Reply: 0xAA, 0xB9, 0x01, RSSI, cks

4.9. LSE_CALIBRATION_CMD (0x3C)

This command configures the LSE oscillator calibration period.

Host: 0xAA, 0x3C, 0x03, Mem_Type, Period0, Period1, cks

Reply: 0xAA, 0xBC, 0x01, status, cks

Status: 0x00: Success
0xFF: Fail

Mem_Type: 0x00: Set value in RAM memory
0xFF: Set value in EEPROM memory

Periodn: LSE calibration interval [s]

To disable automatic calibration:

Host: 0xAA, 0x3C, 0x03, Mem_Type, 0x00, 0x00, cks

Reply: 0xAA, 0xBC, 0x01, status, cks

Status: 0x00: Success
0xFF: Fail

Mem_Type: Use the same value that was used to enable the automatic calibration.

4.10. SET_MODE_CMD (0x40)

Host: 0xAA, 0x40, 0x02, Mem_Type, mode, cks

Reply: 0xAA, 0xC0, 0x01, status, cks

Status: 0x00: Success
0xFF: Fail

Mode: WM-Bus mode

Mem_Type: 0x00: Set value in RAM memory
0xFF: Set value in EEPROM memory

4.11. SET_C_FIELD_CMD (0x41)

Host: 0xAA, 0x41, 0x02, Mem_Type, C-field, cks

Reply: 0xAA, 0xC1, 0x01, status, cks

Status: 0x00: Success
0xFF: Fail

C-field: C-Field value

Mem_Type: 0x00: Set value in RAM memory
0xFF: Set value in EEPROM memory

4.12. TX_MSG_CMD (0x50)

Host: 0xAA, 0x50, Length, <Payload>, cks

Reply: 0xAA, 0xD0, 0x01, status, cks

Status: 0x00: Success
0xFF: Fail

The content of Payload depends on Block1_From_Module_Enable parameter field as follows:

If **Block1_From_Module_Enable = 0**:

Block1 (9 Bytes)	CI Field (1 Byte)	Payload (n Bytes)

If **Block1_From_Module_Enable = 1**:

CI Field (1 Byte)	Payload (n Bytes)

4.13. RX_MSG_IND (0x53)

When module receives a valid WM-Bus frame, then it sets NDATA_INDICATE pin low and then sends one of the following frames, based on the RSSI_Enable parameter:

If RSSI_Enable = 0:

0xAA	0x53	Length (n+10)	Block1 (9 Bytes)	CI Field (1 Byte)	Payload (n Bytes)	Checksum (1 Byte)

If RSSI_Enable = 1:

0xAA	0x53	Length (n+11)	Block1 (9 Bytes)	CI Field (1 Byte)	Payload (n Bytes)	RSSI (1 Byte)	Checksum (1 Byte)

4.14. TX_SYNC_MSG_CMD (0x5A)

This command sets the synchronous message interval and the message payload.

Host: 0xAA, 0x5A, Length, Interval0, Interval1, Interval2, Interval3, <Payload>, cks

Reply: 0xAA, 0xDA, 0x01, status, cks

Status: 0x00: Success
0xFF: Fail

Intervaln: synchronous message transmission interval [s]

The payload length cannot exceed 252 bytes.

In order to disable the periodic transmission of synchronous messages:

Host: 0xAA, 0x5A, 0x04, 0x00, 0x00, 0x00, 0x00, 0xF8

Reply: 0xAA, 0xDA, 0x01, status, cks

Status: 0x00: Success
0xFF: Fail

5. Module Configuration

5.1. WM-Bus Radio Parameters

Parameter	Description	Address	Value Range	Default	Notes
WM_BUS_Mode	WM-Bus Mode	0x00	0x00 - 0x0E	S2 Short preamble	0x00 = S2 Short preamble 0x01 = S2 Long preamble 0x02 = S1 0x03 = S1-m 0x04 = T1 meter 0x05 = T2 meter 0x06 = T2 other 0x07 = R2 meter 0x08 = R2 other 0x09 = C1 meter Frame A 0x0A = C1 meter Frame B 0x0B = C2 meter Frame A 0x0C = C2 meter Frame B 0x0D = C2 other Frame A 0x0E = C2 other Frame B 0x0F = T2 – C2 other
RF_Channel	RF Channel (Used only in R2 mode)	0x01	0 – 9	0	0 = 868.03 MHz 1 = 868.09 MHz 2 = 868.15 MHz 3 = 868.21 MHz 4 = 868.27 MHz 5 = 868.33 MHz 6 = 868.39 MHz 7 = 868.45 MHz 8 = 868.51 MHz 9 = 868.57 MHz
RF_Power	RF power	0x02	0 - 4	4	0 = 0 dBm 1 = +5 dBm 2 = +7 dBm 3 = +10 dBm 4 = +12 dBm
RF_AutoSleep *(valid only for 3200150xAxx)*	Configure sleep	0x03	0 - 1	0	0 = Sleep disable 1 = Sleep enable
RF_AutoSleep[1] *(valid only for 32001605BE8SW)*	Configure sleep	0x03	0 - 2	0	0 = Sleep disable 1 = Deep stop 2 = Shutdown
Rx_Window	RX Window (ms)	0x04	0x00 - 0xFF	0x00	

Note: for more information, see the specification EN 13757- 4.

1. - *Deep stop*:
   - RTC still functional.
   - *Shutdown*:
   - wake-up time greater than deep stop mode.
   - wakeable only via NWAKE pin.
   - no synchronous messages.

5.2. WM-Bus Medium Access Parameters

Parameter	Description	Address	Values Range	Default	Notes
WM-Bus C Field	C Field	0x10	0x00 - 0xFF	0x44	
WM-Bus Man ID0	Manufacturer ID	0x11	0x00 - 0xFF	0x00	
WM-Bus Man ID1	Manufacturer ID	0x12	0x00 - 0xFF	0x00	
WM-Bus Device ID0	Device ID	0x13	0x00 - 0xFF	0x00	
WM-Bus Device ID1	Device ID	0x14	0x00 - 0xFF	0x00	
WM-Bus Device ID2	Device ID	0x15	0x00 - 0xFF	0x00	
WM-Bus Device ID3	Device ID	0x16	0x00 - 0xFF	0x00	
WM-Bus Version	Version	0x17	0x00 - 0xFF	0x00	
WM-Bus Device Type	Device Type	0x18	0x00 - 0xFF	0x00	

5.3. Module Parameters

Parameter	Description	Address	Values Range	Default	Notes
Block1_From_Module_ Enable	Enable management of WM-Bus from Module	0x20	0 - 1	0	
RSSI_Enable	Enable RSSI Indication in communication frame	0x21	0 - 1	0	
NDATA_INDICATE_ TIMEOUT	LSB Timeout in ms	0x22	1 - 255	5	[ms]
UART BAUDRATE	UART Baudrate selection	0x24	0 - 5	4	0 = 9600 1 = 19200 2 = 38400 3 = 57600 4 = 115200

5.4. Internal DATA (Read Only)

Parameter	Description	Notes
SerialNumber0	LSB SN	Serialization at 32 bit
SerialNumber1	Byte 1 SN	Serialization at 32 bit
SerialNumber2	Byte 2 SN	Serialization at 32 bit
SerialNumber3	MSB SN	Serialization at 32 bit
FwVersion0	LSB FW Version	
FwVersion1		
FwVersion2		
FwVersion3	MSB FW Version	

6. Revision History

Revision	Date	Description
0.1	19.03.2025	First version
0.2	11.02.2026	Changed document's title Changed module's image Added the concept of single/dual core module Added GET_TEMPERATURE_CMD
0.3	11.05.2026	Added sleep information for 32001605BE8SW Added LSE calibration command Added synchronous messages command