

eBUS Specifications

Application Layer – OSI 7

V 1.6.1

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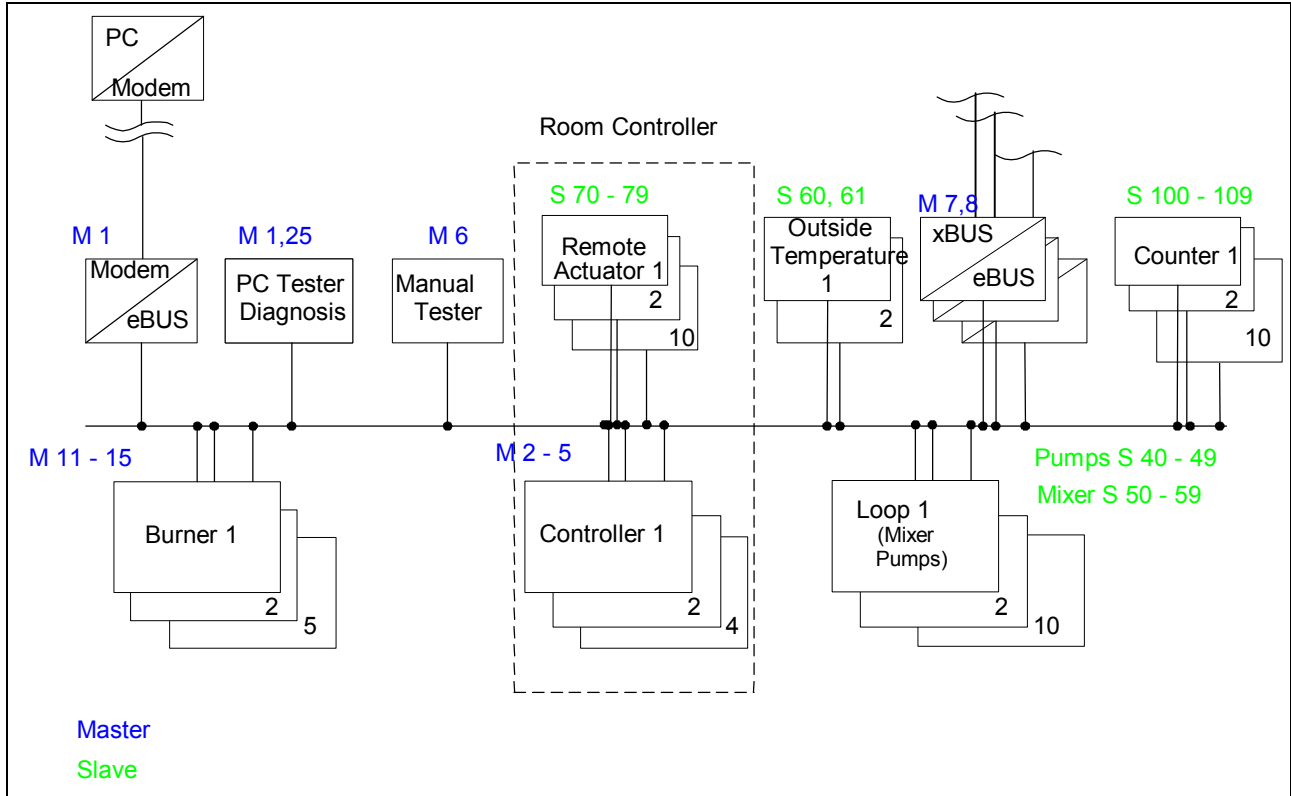
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1 System Overview

The following configuration is the basis for the application layer. It may be application adapted by adding additional modules (address assignment, see appendix to eBUS Application Layer – OSI 7) or component omission. For the standard components, below find respective definitions for eBUS addresses and commands.



Picture 1: Basic Configuration of an eBUS System

2 Definitions

2.1 Assignment of the Master Addresses

The actual assignment of the master addresses may be found in the appendix to the Specifications Layer 7 V1.4.

2.2 Communications Load

Cycle rate	1/x[unit] unique	All x units = one telegram Telegram is sent once, triggered by an event or based on a requirement If sent once, bus load is indicated as 0,0%
Tolerance	± x[unit]	Signifies the deviation of the cycle rate from the indicated value
Bus load	x %	Designates the bus load, caused by the cycle rate Calculation formula: <i>Bus load = No. of bytes * cycle rate * 4,16 * 10⁻³s * 100%</i>

2.3 eBUS-Communications-Rules

1. In master and slave telegram part, standardised commands must be limited to 10 used data bytes.
2. In master and slave telegram part, the sum of mfr.-specific telegram used data bytes must not exceed 14.

2.4.3 Predefinitions

- With all 16-bit types (2 byte), the low-byte is always transmitted first.
- A not explicit specified range acts on the data type's range.
- Is no value given for a replacement value, the replacement value corresponds to the data type's value.

3 Commands

3.1 Service Data Commands Burner Automats (Service 03h)

The service data command burner controls are used for collection of information regarding operating time, start counts and fuel consumption. The secondary commands 00h - 03h are barred for historical reasons.

3.1.1 Complete Reading of Start Counts (Service 03h 04h)

Name:	Complete Reading Start Counts (03h 04h)		
Description:	The sub command start count serves for data acquisition regarding number of starts of a burner control unit. Upon request, the burner control sends three bytes that may be processed in digital form (0-99). The maximal start count reading is 999999.		
Comm. Load:	Cycle rate: once (only in case of service)	Tolerance: -	Bus load: 0,0%

Requirement:

Master /Slave Byte-No.	Abbrev.	Description	Unit	Range	Type/[Res.]	Repl. Value	Notes
M 1	QQ	Source address					
M 2	ZZ	Target address					
M 3	PB = 03h	Service data					
M 4	SB = 04h	Start counter reading					
M 5	NN = 00h	No. of following bytes					
M 6	CRC						
ZZ 7	ACK						
M 8	SYN						

Response:

Master /Slave Byte-No.	Abbrev.	Description	Unit	Range	Type/[Res.]	Repl. Val	Notes
M 1	QQ	Source address					
M 2	ZZ	Target address					
M 3	PB = 03h	Service data					
M 4	SB = 04h	Start counter reading					
M 5	NN = 03h	No. of following bytes					
M 6		Start counter 1s position		0-99	CHAR		
M 7		Start counter 100s position		0-99	CHAR		
M 8		Start counter 10000s position		0-99	CHAR		
M 9	CRC						
ZZ 10	ACK						
M 11	SYN						

3.1.2 Complete Operating Time, Reading Level 1 (Service 03h 05h)

Name: Complete Operating Time, Reading Level 1 (03h 05h)

Description: This sub command serves to scan operating time counter (in case of multiple level burners, level 1) of a burner control unit. Upon request, the burner control sends four bytes that may be processed in decimal form (99.99.99:59).

Comm. Load: Cycle rate: once only Tolerance: - Bus Load: 0,0%
(only in case of service)

Requirement:

Master /Slave Byte-No.	Abbrev.	Description	Unit	Range	Type/[Res.]	Repl. Value	Notes
M 1	QQ	Source address					
M 2	ZZ	Target address					
M 3	PB = 03h	Service data					
M 4	SB = 05h	Op. time level 1					
M 5	NN = 00h	No. of following bytes					
M 6	CRC						
ZZ 7	ACK						
M 8	SYN						

Response:

Master /Slave Byte-No.	Abbrev.	Description	Unit	Range	Type/[Res.]	Repl. Value	Notes
M 1	QQ	Source address					
M 2	ZZ	Target address					
M 3	PB = 03h	Service data					
M 4	SB = 05h	Op. time level 1					
M 5	NN = 04h	No. of following bytes					
M 6		Op. time level 1 minutes		0-59	CHAR		
M 7		Op. time level 1 1s hours		0-99	CHAR		
M 8		Op. time level 1 100s hours		0-99	CHAR		
M 9		Op. time level 1 10000s hours		0-99	CHAR		
M 10	CRC						
ZZ 11	ACK						
M 12	SYN						

3.1.3 Complete Reading Operating Time Level 2 (Service 03h 06h)

Name: Complete Reading Operating Time Level 2 (03h 06h)

Description: This sub command serves to scan operating time counter level 2 of a burner control unit. Upon request, the burner control sends four bytes that may be processed in decimal form (99.99.99:59).

Comm. Load: Cycle rate: once only Tolerance: - Bus load: 0,0%
(only in case of service)

Requirement:

Master /Slave Byte-No.	Abbrev.	Description	Unit	Range	Type/[Res.]	Repl. Value	Notes
M 1	QQ	Source address					
M 2	ZZ	Target address					
M 3	PB = 03h	Service data					
M 4	SB = 06h	Op. time level 2					
M 5	NN = 00h	No. of following bytes					
M 6	CRC						
ZZ 7	ACK						
M 8	SYN						

Response:

Master /Slave Byte-No.	Abbrev.	Description	Unit	Range	Type/[Res.]	Repl. Value	Notes
M 1	QQ	Source address					
M 2	ZZ	Target address					
M 3	PB = 03h	Service data					
M 4	SB = 06h	Op. time level 2					
M 5	NN = 04h	No. of following bytes					
M 6		Op. time level 2 minutes		0-59	CHAR		
M 7		Op. time level 2 1er hours		0-99	CHAR		
M 8		Op. time level 2 100s hours		0-99	CHAR		
M 9		Op. time level 2 10000s hours		0-99	CHAR		
M 10	CRC						
ZZ 11	ACK						
M 12	SYN						

3.1.4 Complete Reading Operating Time, Level 3 (Service 03h 07h)

Name: Complete Reading Operating Time, Level 3 (03h 07h)

Description: This sub command serves to scan the operating time counter, level 3 of a burner control unit. Based on the request, the burner control sends four bytes that may be processed in decimal form (99.99.99:59).

Communications last: Cycle rate: once only (only in case of service) Tolerance: - Bus load: 0,0%

Requirements:

Master /Slave Byte-No.	Abbrev.	Description	Unit	Range	Type/[Res.]	Repl. Value	Notes
M 1	QQ	Source address					
M 2	ZZ	Target address					
M 3	PB = 03h	Service data					
M 4	SB = 07h	Op. time level 3					
M 5	NN = 00h	No. of following bytes					
M 6	CRC						
ZZ 7	ACK						
M 8	SYN						

Response:

Master /Slave Byte-No.	Abbrev.	Description	Unit	Range	Type/[Res.]	Repl. Value	Notes
M 1	QQ	Source address					
M 2	ZZ	Target address					
M 3	PB = 03h	Service data					
M 4	SB = 07h	Op. time level 3					
M 5	NN = 04h	No. of following bytes					
M 6		Op. time level 3 minutes		0-59	CHAR		
M 7		Op. time level 3 1s hours		0-99	CHAR		
M 8		Op. time level 3 100s hours		0-99	CHAR		
M 9		Op. time level 3 10000s hours		0-99	CHAR		
M 10	CRC						
ZZ 11	ACK						
M 12	SYN						

3.1.5 Complete Reading Fuel Quantity Counter (Service 03h 08h)

Name: Complete Reading Fuel Quantity Counter (03h 08h)

Description: This sub command serves to scan the fuel quantity counter of a burner control unit. Upon request, the burner control sends five bytes, four of which may be processed in decimal form (99.99.99.99), one byte serves to indicate the value unit.

Comm. Load: Cycle rate: once only Tolerance: - Bus load: 0,0%
(only in case of service)

Requirements:

Master /Slave Byte-No.	Abbrev.	Description	Unit	Range	Type/[Res.]	Repl. Value	Notes
M 1	QQ	Source address					
M 2	ZZ	Target address					
M 3	PB = 03h	Service data					
M 4	SB = 08h	Fuel quantity					
M 5	NN = 00h	No. of following bytes					
M 6	CRC						
ZZ 7	ACK						
M 8	SYN						

Response:

Master /Slave Byte-No.	Abbrev.	Description	Unit	Range	Type/[Res.]	Repl. Value	Notes
M 1	QQ	Source address					
M 2	ZZ	Target address					
M 3	PB = 03h	Service data					
M 4	SB = 08h	Fuel quantity					
M 5	NN = 05h	No. of following bytes					
M 6		Unit: 1 = if oil: Liter (l) 2 = if gas: Cubic meters (m ³)			CHAR		
M 7		Fuel quantity 1s digit		0-99	CHAR		
M 8		Fuel quantity 100s digit		0-99	CHAR		
M 9		Fuel quantity 10000s digit		0-99	CHAR		
M 10		Fuel quantity 100000s digit		0-9	CHAR		
M 11	CRC						
ZZ 12	ACK						
M 13	SYN						

3.1.6 Read Meter Reading (Service 03h 10h)

Name: Read Meter Reading (03h 10h)

Description: The sub command read meter reading serves to enquire a chosen meter reading. The addressed participant sends a master or slave telegram due to the request.
Comm. Load: Cycle rate: once only Tolerance: - Bus load: 0,0%
 (only in case of service)

Requirements:

Master /Slave Byte-No.	Abbrev.	Description	Unit	Range	Type/[Res.]	Repl. Value	Notes
M 1	QQ	Source address					
M 2	ZZ	Target address / Slave					
M 3	PB = 03h	Service data					
M 4	SB = 10h	Meter reading					
M 5	NN = 2h	No. of following bytes					
M 6	DB1	Type of meter: 00 = Start-up meter 01 = Operating hours layer 1 02 = Operating hours layer 2 03 = Operating hours layer 3 04 = Operating hours layer 4 05 = modulating operation 10 = Quantity of fuel remaining values still free			BYTE		
M 7	DB2	Type of fuel: 00 = Over-all meter reading of all fuels for the chosen type of meter. 01 = Oil 02 = Gas remaining values still free			BYTE		
M 8	CRC						

If target address == master-address then:

ZZ 9	ACK						
M 10	SYN						

If target address == slave-address then:

S 1	ACK						
S 2	NN = 06h	No. of following bytes					
S 3		Meter reading		0-99	BCD		Minutes / 1s digits
S 4		Meter reading		0-99	BCD		1s hours / 100er digits
S 5		Meter reading		0-99	BCD		100s hours / 10000s digits
S 6		Meter reading		0-99	BCD		10000s hours / 1000000 digits
S 7		Type of meter, definition see M6			BYTE		
S 8		Type of fuel, definition see M7			BYTE		
S 9	CRC						
M 9	ACK						
M 10	SYN						

Response at ZZ=master-address:

Master /Slave Byte-No.	Abbrev.	Description	Unit	Range	Type/[Res.]	Repl. Value	Notes
M 1	QQ	Source address					
M 2	ZZ	Target address					
M 3	PB = 03h	Service data					
M 4	SB = 10h	Meter reading					
M 5	NN = 06h	No. of following bytes					
M 6		Meter reading		0-99	BCD		minutes / 1s digits
M 7		Meter reading		0-99	BCD		1s hours / 100s digits
M 8		Meter reading		0-99	BCD		100s hours / 10000s digits
M 9		Meter reading		0-99	BCD		10000s hours / 1000000s digits
M 10		Type of meter, definition see request M 6 / DB 1			BYTE		
M 11		Type of fuel, definition see request M 7 / DB 2			BYTE		
M 12	CRC						
ZZ 13	ACK						
M 14	SYN						

3.2 Burner Control Commands (Service 05h)

The burner control commands are needed for communication purposes between control unit, room sensor or control components.

3.2.1 Operational Requirements between Burner Control Unit and Room Controller (Service 05h 00h)

Name:	Operational Requirements between Burner Control Unit and Room Controller (05h 00h)
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Description:	<p>This sub command is designed according to the requirements of room controller operational data, to which the burner control shall respond.</p> <p>It is issued by the burner control, when it requires data from the room controller. By way of the first data byte, called "Requirement Status", it is determined if the transmission shall be started or stopped. The controller reacts to these requirements with cyclic transmissions, based on a fixed cycle time. It can, however, also start a transmission as a result of some occurred change in transmitted data values.</p>
Comm. Load:	Cycle rate: 1 / 15 Min Tolerance: +100% ; -90% Bus load: 0,0%

Master /Slave Byte-No.	Abbrev.	Description	Unit	Range	Type/ [Res.]	Repl. Value	Note
M 1	QQ	Source address					
M 2	ZZ	Target address					
M 3	PB = 05h	Burner control					
M 4	SB = 00h	Op. data request					
M 5	NN = 01h	No. of following bytes					
M 6	55h AAh	Requirement status: Cyclic transmission close Cyclic transmission start			BYTE		
M 7	CRC						
ZZ 8	ACK						
M 9	SYN						

3.2.2 Operational Data of Room Controller to Burner Control Unit (Service 05h 01h)

Name: **Operational Data of Room Controller to Burner Control Unit (05h 01h)**

Description: This sub command is responsible for one time or cyclic sending of controller operational data. Sending of data from room controller is executed either upon request by command "Operational Data Request of Burner Control Unit to Room Controller" (05h 00h) or independently from room controller at certain intervals. The second option is not recommended, because it brings unnecessary load to the bus, even when there is no need for data. The minimum cycle time is 5 seconds. In case of changes within this cycle time, this command ought to be issued also.

Note: Values that are not furnished or cannot be by the room controller are covered by agreed upon replacement values.

Comm. Load: Cycle rate: 1 / 15s Tolerance: +/-5s Bus load: 0,36%

Master /Slave Byte-No.	Abbrev.	Description	Unit	Range	Type/ [Res.]	Repl. Value	Note
M 1	QQ	Source address					
M 2	ZZ	Target address					
M 3	PB = 05h	Burner control					
M 4	SB = 01h	Operational data controller					
M 5	NN = 05h	Length of data					
M 6	00h 55h AAh CCh DDh EEh	Status heat request: Shut down burner Service water preparation Heating operation Emission check QC Service Function Controller stop function			BYTE		
M7		Bailer target value	°C	0-100	CHAR		hexadecimal 00h .. 64h
M8		Service water target value	°C	0-100	CHAR		hexadecimal 00h .. 64h
M9		Outside temp. effective value	°C	-50..+50	SIGN CHAR	3Fh	hexadecimal E2h .. 32h
M10		Degree of setting	%	0-100	CHAR		Degree of setting between min. and max. boiler performance at controller stop function or for burner control units without integrated performance control.
M 11	CRC						
ZZ 12	ACK						
M 13	SYN						

3.2.3 Operational Data of Room Controller to Burner Control Unit (Service 05h 02h)

Name: **Operational Data of Room Controller to Burner Control Unit (05h 02h)**

Description: This sub command is designed for the acquisition of operational data from the burner control unit. The room controller transmits it, whenever data are needed by the burner control unit. By way of the first data byte "Block number" will be determined which data are to be sent. The data are subsequently sent by means of Service 05h 03h, for example in cyclic fashion (if block No. 1). The cycle may be delayed if the burner control unit is burdened with other requirements.

Comm. Load: Cycle rate: 1 / 15 min Tolerance: +100% -90% Bus load: 0,0%

Master /Slave Byte-No.	Abbrev.	Description	Unit	Range	Type/[Res.]	Repl. Value	Note
M 1	QQ	Source address					
M 2	ZZ	Target address					
M 3	PB = 05h	Burner control					
M 4	SB = 02h	Operational data request					
M 5	NN = 01h	Length of data					
M 6	00h 01h 02h ... xxh	Block number: Transmission terminated Block No. 1 send cyclic Block No. 2 send once ... Block No. xx send once			BYTE		
M 7	CRC						
ZZ 8	ACK						
M 9	SYN						

3.2.4 Operational Data of Burner Control unit to Room Control Unit (Service 05h 03h Block 1)

Name: **Operational Data of Burner Control unit to Room Control Unit
(05h 03h Block 1)**

Description: This sub command is designed for cyclic transmission of operational data of the burner control unit. Transmission of data from the burner control unit is executed upon request through command "Operational data request by the room controller to the burner control unit" (05h 02h, Block No. 1). It is feasible to send multiple blocks. The first data byte contains the block number and must be co-considered.

Note: Values that are not furnished by the burner control unit or cannot be supplied are covered by mutually agreed replacement values.

Comm. Load: Cycle rate: 1 / 10 s Tolerance: Bus load: 0,66%
to 1 / 1 min

Master /Slave Byte-No.	Abbrev.	Description	Unit	Range	Type/ [Res.]	Repl. Value	Note
M 1	QQ	Source address					
M 2	ZZ	Target address					
M 3	PB = 05h	Burner control					
M 4	SB = 03h	Operational data (FA)					
M 5	NN = 08h	Length of data					
M 6	01h	Block number			BYTE		
M 7		Status indication State indication (State-Number)					In case of error (Bit7 in M8 = 1) mfr.-specific report or error codes.
M 8		Bit 0: LDW Bit 1: GDW Bit 2: WS Bit 3: Flame Bit 4: Valve 1 Bit 5: Valve 2 Bit 6: UWP Bit 7: Alarm					In this byte, signal state of the burner control unit are transmitted: 0 = OFF 1 = ON
M 9		Setting degree between min. and max. boiler performance	%	0-100	CHAR		hexadecimal 00h..64h
M 10	KT	Boiler temperature	°C	0-100	DATA1c [0,5]		hexadecimal 00h..C8h
M 11	RT	Return water temperature	°C	0-100	CHAR		hexadecimal 00h..64h
M 12	BT	Boiler temperature	°C	0-100	CHAR		hexadecimal 00h..64h
M 13	AT	Outside temperature	°C	-30-50	SIGN. CHAR	3Fh	hexadecimal E2h..32h
M 14	CRC						
ZZ 15	ACK						
M 16	SYN						

3.2.6 Response of Burner Control Unit to Request "Control Stop" by Room Controller (Service 05h 04h)

Name: Response of Burner Control Unit to Request "Control Stop" by Room Controller (05h 04h)

Description: By means of a telegram containing effective setting degree of blower and its min. and max. limits to the room controller, this sub command sends the request "Control Stop" from the room controller by way of the protocol "Operational Data of Room Controller to Burner Control Unit " (05h 01h) . This telegram is sent following each request.

Command call-up as eBUS telegram: Response by burner control unit to request "Control Stop " from room controller

Comm. Load: Cycle rate: 1 / 15s Tolerance: +/- 5s Bus load: 0,30%
(only in event of service)

Master /Slave Byte-No.	Abbrev.	Description	Unit	Range	Type/ [Res.]	Repl. Value	Note
M 1	QQ	Source address					
M 2	ZZ	Target address					
M 3	PB = 05h	Burner control					
M 4	SB = 04h	Response to "Control Stop"					
M 5	NN = 03h	Length of data					
M 6		Effective setting degree between min. and max. boiler performance	%	0-100	CHAR		hexadecimal 00h .. 64h
M 7		Min. setting degree	%	0-100	CHAR		hexadecimal 00h .. 64h
M 8		Max. setting degree	%	0-100	CHAR		hexadecimal 00h .. 64h
M 9	CRC						
ZZ 10	ACK						
M 11	SYN						

3.2.7 Barred Service (Service 05h 05h)

With reference to the definition, this service is barred for reasons of compatibility!

3.2.8 Operational Data Requirement of Burner Control Unit to Room Controller (Service 05h 06h)

Name: **Operational Data Requirement of Burner Control Unit to Room Controller (05h 06h)**

Description: This sub command is designed for retrieval request of room controller operational data, to which the room controller should react by Service 05h 07h. The burner control unit issues the sub-command, when it requires data from the room controller. The decision as to whether to start or stop data transmission is made by the first data byte "Requirement Status". The room controller reacts to this request by cyclic transmission at a defined cycle frequency. However, it can also initiate a transmission, if any change has occurred to the values.

Comm. Load: Cycle rate: 1 / 15 Min Tolerance: +100% ; -90% Bus load: 0,0%

Master /Slave Byte-No.	Abbrev.	Description	Unit	Range	Type/[Res.]	Repl. Value	Note
M 1	QQ	Source address					
M 2	ZZ	Target address					
M 3	PB = 05h	Burner control					
M 4	SB = 06h	Operational data request					
M 5	NN = 01h	No. of following bytes					
M 6	55h AAh	Request status: Terminate cyclic transmission Start cyclic transmission			BYTE		
M 7	CRC						
ZZ 8	ACK						
M 9	SYN						

3.2.9 Operational Data from Room Controller to Burner Control Unit (Service 05h 07h)

Name: **Operational Data from Room Controller to Burner Control Unit (05h 07h)**

Description: This sub command is responsible for one time or cyclic transmission of controller operational data. Data are transmitted by the room controller either upon command "Operational Data Request by Burner Control Unit to Room Controller " (05h 06h) or by the room controller after a defined time interval. It is not necessarily a good idea to use the second alternative, because it causes unnecessary busload. This even when there is no need for data. The minimum cycle time is 5 seconds. In case of changes within this interval, a command should be initiated.

Note: Values that are not supplied or cannot be supplied by the room controller are replaced by agreed upon replacement values.

Comm. Load: Cycle rate: 1 / 15s Tolerance: +/-5s Bus load: 0,47%

Master /Slave Byte-No.	Abbrev.	Description	Unit	Range	Type/[Res.]	Repl. Value	Note
M 1	QQ	Source address					
M 2	ZZ	Target address					
M 3	PB = 05h	Burner control					
M 4	SB = 07h	Operational data of controller					
M 5	NN = 09h	Length of data					
M 6	00h 01h 55h AAh CCh DDh EEh	Status heat request: Shut down burner No action Service water preparation Heating operation Emission check Tech check function Controller stop function			BYTE		
M 7	00h 01h 02h 03h 04h still avail.	NO action Turn off boiler pump Turn on boiler pump Turn off variable user Turn on variable user Still available			BYTE		Variable users e.g. circulation pump
M 8- M 9		Boiler target temperature	°C	0-2000	DATA2c [1/16]		
M 10- M 11		Boiler target pressure	bar	0-100	DATA2b [1/256]		
M 12		Setting degree	%	0-100	DATA1c [0,5]	FFh	Stepped operation at M6=44h Values: 0 = off 1= step 1 4 = step 4 else: mod. operation: Setting degree

							between min. and max. boiler performance at control-stop-function or for automats without integrated power control
M 13		Service water target value	°C	0-100	DATA1c	FFh	
M 14		Election of fuel: Bit1/Bit0 = 00 don't care Bit1/Bit0 = 01 Gas Bit1/Bit0 = 10 Oil Bit1/Bit0 = 11 don't care				FFh	
M 15	CRC						
ZZ 16	ACK						
M 17	SYN						

3.2.10 Operational Data Requirement by Room Controller to Burner Control Unit (Service 05h 08h)

Name: **Operational Data Requirement by Room Controller to Burner Control Unit (05h 08h)**

Description: This sub command is designed for acquisition of operational data from burner control unit. The requiring room controller issues it, when it needs data from burner control unit (reply with Service 05h 9h). The determination as to which data block needs to be sent is made by the first data byte "Block Number". The cycle can be delayed, if the burner control unit is in process of receiving other requirements.

Comm. Load: Cycle rate: 1 / 15 min Tolerance: +100% -90% Bus load: 0,0%

Master /Slave Byte-No.	Abbrev.	Description	Unit	Range	Type/[Res.]	Repl. Value	Note
M 1	QQ	Source address					
M 2	ZZ	Target address					
M 3	PB = 05h	Burner control					
M 4	SB = 08h	Operational data request					
M 5	NN = 01h	Length of data					
M 6	00h 01h 02h ... xxh	Block number: Terminate transmission Block No. 1 cyclic transmission Block No. 2 transmit once ... Block No. Xx transmit once			BYTE		
M 7	CRC						
ZZ 8	ACK						
M 9	SYN						

		M9 Bit3 = 1			[1/16]		
M 15	CRC						
ZZ 16	ACK						
M 17	SYN						

3.2.12 Operational Data of Burner Control Unit to Room Controller Block 2 (Service 05h 09h Block 2)

Name: **Operational Data of Burner Control Unit to Room Controller Block 2 (05h 09h Block 2)**

Description: This sub command is responsible for one time transmission of operational data by the burner control unit. Transmission of data is executed upon request by means of command "Operational Data Request of Room Controller to Burner Control Unit" (05h 08h, Block number 2). It is feasible to transmit multiple blocks. The first data byte contains the block number and must be considered.
Note: Values that are not supplied by the burner control unit or that cannot be delivered, are replaced by mutually agreed upon replacement values.

Comm. Load: Cycle rate: 1 / 10 s Tolerance: Bus load: 0,70%
to 1 / 1 min

Master /Slave Byte-No.	Abbrev.	Description	Unit	Range	Type/ [Res.]	Repl. Value	Note
M 1	QQ	Source address					
M 2	ZZ	Target address					
M 3	PB = 05h	Burner control					
M 4	SB = 09h	Operational data (FA)					
M 5	NN = 09h	Length of data					
M 6	02h	Block number					
M 7- M 8		O2-value	%	0-25	DATA2b [1/256]		7FFFh falls O₂-Messung ungültig
M 9- M 10		Input air temperature	°C	-20-400	DATA2c [1/16]		
M 11- M 12		Exhaust gas temperature (ARF value)	°C	-20-400	DATA2c [1/16]		
M 13- M 14		Boiler target temperature value at M9 Bit3 = 0 or boiler target pressure end value at M9 Bit3 = 1	°C bar	0-2000 0-100	DATA2c [1/16] DATA2c [1/16]		
M 15	CRC						
ZZ 16	ACK						
M 17	SYN						

3.2.13 Operational Data of Burner Control Unit to Room Controller Block 3 (05h 09h Block 3)

Name: **Operational Data of Burner Control Unit to Room Controller Block 3 (05h 09h Block 3)**

Description: This sub command is responsible for one time transmission of operational data by the burner control unit. Transmission of data is executed upon request by means of command "Operational Data Request of Room Controller to Burner Control Unit" (05h 08h, Block number 3). It is feasible to transmit multiple blocks. The first data byte contains the block number and must be considered.
 Note: Values that are not supplied by the burner control unit or that cannot be delivered, are replaced by mutually agreed upon replacement values.

Comm. Load: Cycle rate: 1 / 10 s Tolerance: Bus load: 0.70%
 to

Master /Slave Byte-No.	Abbrev.	Description	Unit	Range	Type/ [Res.]	Repl. Value	Note
M 1	QQ	Source address					
M 2	ZZ	Target address					
M 3	PB = 05h	Burner control					
M 4	SB = 09h	Operational data (FA)					
M 5	NN = 09h	Length of data					
M 6	03h	Block number					
M 7- M 8		Fuel burning technological coefficient	%	0-110	DATA2c [1/16]	8000h	
M 9 - M 10		Free				8000h	
M 11 - M 12		Free				8000h	
M 13		Free				FFh	
M 14		Free				FFh	
M 15	CRC						
ZZ 16	ACK						
M 17	SYN						

3.2.14 Configuration Data Requirement of Room Controller to Burner Control Unit (Service 05h 0Ah)

Name: Configuration Data Requirement of Room Controller to Burner Control Unit (05h 0Ah)

Description: This sub command is designed for the acquisition of configuration data of the burner control unit. It is issued by the inquiring room controller, when it needs data from the burner control unit (response with Service 05h 0Bh).

Comm. Load: Cycle rate: one time Tolerance: Bus load: 0,0%

Master /Slave Byte-No.	Abbrev.	Description	Unit	Range	Type/ [Res.]	Repl. Value	Note
M 1	QQ	Source address					
M 2	ZZ	Target address					
M 3	PB = 05h	Burner control					
M 4	SB = 0Ah	Configuration data requirement					
M 5	NN = 00h	Length of data					
M 6	CRC						
ZZ 7	ACK						
M 8	SYN						

3.2.15 Configuration Data of Burner Control Unit to Room Controller (Service 05h 0Bh)

Name:	Configuration Data of Burner Control Unit to Room Controller (05h 0Bh)
--------------	---

Description:	This sub command conveys configuration data upon request of room controller (Service 05h 0Ah).		
Comm. Load:	Cycle rate: one time	Tolerance: ---	Bus load: 0,00%

Master /Slave Byte-No.	Abbrev.	Description	Unit	Range	Type/ [Res.]	Repl. Value	Note
M 1	QQ	Source address					
M 2	ZZ	Target address					
M 3	PB = 05h	Burner control					
M 4	SB = 0Bh	Configuration data (FA)					
M 5	NN = 0Ah	Length of data					
M 6		Use water load Bit0 = 1 existing Bit0 = 0 not existing Bit1 = 1 parallel Bit1 = 0 Preference Bit2 = 1 Thermostat Bit2 = 0 no Thermostat Bit3 = 1 Flow through heater Bit3 = 0 no Flow through htr. Bit4 –Bit 7 free repl. Val. = 0			BIT		
M 7		Min. setting	%	0-100	DATA1c [0,5]		
M 8		Min. BW target temperature	°C	0-100	DATA1c [0,5]		Setting ranges
M 9		Max. BW target temperature	°C	0-100	DATA1c [0,5]		
M 10		Min. boiler target temperature	°C	0-100	DATA1c [0,5]		Setting ranges
M 11		Max. boiler target temperature	°C	0-100	DATA1c [0,5]		
M 12 – M 13		Free				8000h	
M 14		Free				FFh	
M 15		Free				FFh	
M 16	CRC						
ZZ 17	ACK						
M 18	SYN						

3.2.16 Operational Requirements of Burner Control Unit to Room Controller (Service 05h 0Ch)

Name: **Operational Requirements of Burner Control Unit to Room Controller (Service 05h 0Ch)**

Description: This sub command is designed for acquisition of operational data of the room controller. It is issued by the burner control unit, when it is in need of data from the room controller (Response by service 05h 0Dh).

Comm. Load: Cycle rate: one time Tolerance: Bus load: 0,0%

Master /Slave Byte-No.	Abbrev.	Description	Unit	Range	Type/ [Res.]	Repl. Value	Note
M 1	QQ	Source address					
M 2	ZZ	Target address					
M 3	PB = 05h	Burner control					
M 4	SB = 0Ch	Operational data acquisition					
M 5	NN = 01h	Length of data					
M 6	00h 01h 02h 03h 04h	Terminate transmission Request cyclic transmission Request event driven transmission Request single transmission Request cyclic and event driven transmission			BYTE		
M 7	CRC						
ZZ 8	ACK						
M 9	SYN						

3.2.17 Operational Data of Room Controller to Burner Control Unit (Service 05h 0Dh)

Name:	Operational Data of Room Controller to Burner Control Unit (Service 05h 0Dh)
--------------	---

Description:	This sub command conveys cyclic and/or event driven (change by min. 1°C or in case of status change) operational data to burner control unit (Request through 05h 0Ch).		
Comm. Load:	Cycle rate: 1 / 10 s	Tolerance: +/- 5s	Bus load: 0,75%

Master /Slave Byte-No.	Abbrev.	Description	Unit	Range	Type/ [Res.]	Repl. Value	Note
M 1	QQ	Source address					
M 2	ZZ	Target address					
M 3	PB = 05h	Burner control					
M 4	SB = 0Dh	Operational data controller					
M 5	NN = 0Ah	Length of data					
M 6		Room temperature target	°C	0-100	DATA1C [0,5]		
M 7-8		Room temperature actual	°C	-50 - 50	DATA2c [1/16]		
M 9		Bit0 = 1 SW preparation active Bit1 – Bit7 free repl. value = 0		BIT			Purpose info of FA by the SW preparing controller
M 10 – M 11		Free				8000h	
M 12 – M 13		Free				8000h	
M 14		Free				FFh	
M 15		Free				FFh	
M 16	CRC						
ZZ 17	ACK						
M 18	SYN						

3.3 System Data Commands (Service 07h)

The system date, the clock time as well the outside temperature are managed by heating system controller 0. Heating system controller 0 assures that this information in the system are periodically distributed to all participants by means of broadcast news (07h 00h). Modifications to these data in heating system controllers 0 are possible for date and clock time by means of services 07h 01h, for outside temperature by means of services 07h 02h. Modifications are executed by means of operator interfaces. Services 07h 03h and 07h 04h enable frictionless communications between the individual components, because they publicise the supported commands or their identity respectively.

3.3.1 Date/Time Message of an eBUS Master (Service 07h 00h)

Name:	Date/Time Message of an eBUS Master (07h 00h)		
Description:	An eBus sends this telegram periodically. It transmits the clock time as well as the reading of outside temperature to all bus participants by this broadcast telegram.		
Comm. Load:	Cycle rate: 1 / 60s	Tolerance:	Bus load: 0,11%

Master /Slave Byte-No.	Abbrev.	Description	Unit	Range	Type/ [Res.]	Repl. Value	Note
M 1	QQ	Source address					
M 2	ZZ = FEh	Target address					Broadcast
M 3	PB = 07h	System command					
M 4	SB = 00h	Date/Time message					
M 5	NN = 09h	Length of data					
M 6	TA_L	Outside temperature	°C	-50,0-50,0	DATA2b [1/256]		
M 7	TA_H						
M 8	Ss	Seconds	Sec	0..59	BCD		
M 9	Min	Minutes	Min	0..59	BCD		
M 10	Hh	Hours	Hrs	0..23	BCD		
M 11	Dd	Day		1..31	BCD		
M 12	Mm	Month		1..12	BCD		
M 13	Ww	Weekday		1..7	BCD		
M 14	Yy	Year		0..99	BCD		
M 15	CRC						
M 16	SYN						

3.3.2 Setting Date/Time (Service 07h 01h)

Name:	Setting Date/Time (07h 01h)		
Description:	With the help by this telegram, the clock time (e.g. in heating system controller 0) may be set by means of a PC, the manual terminal or a radio clock.		
Comm. Load:	Cycle rate: infrequent (service event is transmitted when free channel capacity available)	Tolerance: -	Bus load: 0,0%

Master /Slave Byte-No.	Abbrev.	Description	Unit	Range	Type/[Res.]	Repl. Value	Note
M 1	QQ	Source address					
M 2	ZZ	Target address					
M 3	PB = 07h	System command					
M 4	SB = 01h	Date/Time setting					
M 5	NN = 09h	Length of data					
M 8	ss	Seconds	Sec	0..59	BCD		
M 9	min	Minutes	Min	0..59	BCD		
M 10	hh	Hours	Hour	0..23	BCD		
M 11	dd	Tag		1..31	BCD		
M 12	mm	Month		1..12	BCD		
M 13	ww	Weekday		1..7	BCD		
M 14	yy	Year		0..99	BCD		
M 15	TA_L	Outside temperature	°C	-50,0-50,0	DATA2b [1/256]		
M 16	TA_H						
M 17	CRC						
ZZ 18	ACK						
M 19	SYN						

3.3.3 Setting Outside Temperature (Service 07h 02h)

Name: **Setting Outside Temperature (07h 02h)**

Description: During service, the outside system temperature can temporarily or permanently be set to a given value.
Comm. Load: Cycle rate: one time Tolerance: Bus load: 0,0%
 (only in event of service)

Master /Slave Byte-No.	Abbrev.	Description	Unit	Range	Type / [Res.]	Repl. Value	Note
M 1	QQ	Source address					
M 2	ZZ	Target address					
M 3	PB = 07h	System command					
M 4	SB = 02h	Setting outside temperature					
M 5	NN = 03h	Length of data					
M 6	TA_L	Outside temperature	°C	-50,0-50,0	DATA2b [1/256]		
M 7	TA_H						
M 8	TA_valid 00h 9Bh (155)	Until further notice Duration in minutes	Min	0..255	BYTE		
M 9	CRC						
ZZ 10	ACK						
M 11	SYN						

3.3.4 Query of supported Commands (Service 07h 03h)

Name: **Query of supported Commands (07h 03h)**

Description: By means of this telegram, it is for example possible to inquire from a PC which telegrams are supported by a bus member.
Comm. Load: Cycle rate: one time Tolerance: - Bus load: 0,0%
 (only in event of service)

Master /Slave Byte-No.	Abbrev.	Description	Unit	Range	Type / [Res.]	Repl. Value	Note
M 1	QQ	Source address					
M 2	ZZ	Target address (Slave)					
M 3	PB = 07h	System commands					
M 4	SB = 03h	Prompting supported commands					
M 5	NN = 01h	Length of data					
M 6	SB_x 00h 01h	Secondary command requested First 8 secondary commands [0..7] next 8 secondary commands [8..15] etc.			BYTE		
M 7	CRC						
S 1	ACK						
S 2	NN = 0Ah	Length of data					
S 3	vv	Version		0..99	BCD		
S 4	rr	Revision		0..99	BCD		
S 5	PB 05	"1" if secondary command is supported			BIT		
S 6	PB 06						
S 7	PB 07						
S 8	PB 08						
S 9	PB 09						
S 10	PB 0A						
S 11	PB 0B						
S 12	PB 0C						
S 13	CRC						
M 8	ACK						
M 9	SYN						

3.3.5 Identification (Service 07h 04h)

Name:	Identification (07h 04h)
Description:	<p>Upon request, each member ought to be in a position to identify him-/herself, which is enabled by this service: Manufacturer, type of equipment and version/revision of software may be revealed.</p> <p>A master in the form of a broadcast may use this service, in order to inform all bus participants about its own identity.</p>
Comm. Load:	Cycle rate: one time Tolerance: - Bus load: 0,0% (only in event of service)


Master/ Slave Byte- No.	Abbrev.	Description	Unit	Range	Type / [Res.]	Repl. Value	Note
M 1	QQ	Source address					
M 2	ZZ	Target address (Slave)					
M 3	PB = 07h	System commands					
M 4	SB = 04h	Identification					
M 5	NN = 00h	Length of data					
M 7	CRC						
S 1	ACK						
S 2	NN = 0Ah	Length of data					
S 3	HH	Manufacturer		0..99	BYTE		Coding see next page
S 4-8: S4 S5 S6 S7 S8	gg	Unit ID (5 Byte) Unit_ID_0 Unit_ID_1 Unit_ID_2 Unit_ID_3 Unit_ID_4	ASCII		5*BYTE		
S 9	vv	Software version		0..99	BCD		Version vv.rr
S 10	rr	Revision		0..99	BCD		
S 11	vv	Hardware version		0..99	BCD		Version vv.rr
S 12	rr	Revision		0..99	BCD		
S 13	CRC						
M 8	ACK						
M 9	SYN						

Broadcast (Initialising)

Master/ Slave Byte- No.	Abbrev.	Description	Unit	Range	Type [Res.]	Repl. Value	Note
M 1	QQ	Source address					
M 2	ZZ = FEh	Target address = Broadcast					
M 3	PB = 07h	System commands					
M 4	SB = 04h	(Self) Identification					
M 5	NN = 0Ah	Length of data					
M 6	HH	Manufacturer		0..99	BYTE		
M 7-11	gg	Unit ID (5 Byte)	ASCII				
M 12	vv	Software version		0..99	BCD		Version vv.rr
M 13	rr	Revision		0..99	BCD		
M 14	vv	Hardware version		0..99	BCD		Version vv.rr
M 15	rr	Revision		0..99	BCD		
M 16	CRC						
M 17	SYN						

3.3.5.1 Manufacturer Coding:

The effective manufacturer coding is found at the beginning of Specification Layer 7 V1.4.

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3.3.6 Query of supported Commands (Service 07h 05h)

Name: **Query of supported Commands (07h 05h)**

Description: By means of this telegram, it is for example possible to inquire from a PC which telegrams are supported by a bus member.
Comm. Load: Cycle rate: one time Tolerance: - Bus load: 0,0%
 (only in event of service)

Master /Slave Byte-No.	Abbrev.	Description	Unit	Range	Type / [Res.]	Repl. Value	Note
M 1	QQ	Source address					
M 2	ZZ	Target address (slave)					
M 3	PB = 07h	System commands					
M 4	SB = 03h	Query supported commands					
M 5	NN = 02h	Length of data					
M 6	SB_x 00h 01h	Secondary command desirable: The first 8 secondary commands The subsequent 8 secondary commands etc.			BYTE		
M 7	00h = Block 0 01h = Block 1 1Fh = Block 31	Specification of desired primary command block: Block 0 : PB00h to PB07h Block 1 : PB08h to PB0Fh Block 2 : PB10h to PB17h Block 3 : PB18h to PB1Fh Block 31: PBF8h to PBFh			BYTE		
M 8	CRC						
S 1	ACK						
S 2	NN = 0A	Length of data					
S 3	vv	Version		0..99	BCD		
S 4	rr	Revision		0..99	BCD		
S 5	PB x	x = Number of 1 st primary command from selected block <i>Example:</i> <i>selected Block 1 =></i> <i>S 5 -> PB08</i> <i>S 6 -> PB09</i> <i>S 12 -> PB0F</i>			BIT		The indiv. bits of bytes S5 to S12 represent a secondary command. <i>Example:</i> <i>00h in M6 =></i> <i>[Bit0 = SB0,.., Bit7=SB7]</i> <i>01h in M6 =></i> <i>[Bit0 = SB8,.., Bit7=SB15]</i> Herein, the respective bit is "1", if the secondary command is supported
S 6	PB x+1						
S 7	PB x+2						
S 8	PB x+3						
S 9	PB x+4						
S 10	PB x+5						
S 11	PB x+6						
S 12	PB x+7						
S 13	CRC						
M 9	ACK						
M 10	SYN						

3.3.7 Inquiry of Existence (Service 07h FEh)

Name: **Inquiry of Existence (07h FEh)**

Description: Upon receiving such a request, each master must transmit at the earliest feasible time. For this, either an already intended telegram may be placed on the bus or, alternatively, a sign of life telegram (service 07h FFh) may be sent.

The command does not have to be set as a broadcast.
This command should be used infrequently, because it creates significant bus load.

The command enables identification of all ready-to-send masters on the bus.

Comm. Load: Cycle rate: once Tolerance: - Bus load: 0,0%
(only in case of service)

Master /Slave Byte-No.	Abbrev.	Description	Unit	Range	Type / [Res.]	Repl. Value	Note
M 1	QQ	Source address					
M 2	ZZ = FEh	Target address (Broadcast)					
M 3	PB = 07h	System commands					
M 4	SB = FEh	Query of existence					
M 5	NN = 00h	Length of data					
M 7	CRC						
M 8	SYN						

3.3.8 Sign of Life (Service 07h FFh)

Name: **Sign of Life (07h FFh)**

Description: Responds to a inquiry of existence (07h FEh):

Following receipt of a request (07h FEh), each master must use its next possible right to transmit and send. For this, it may either send a preplanned telegram or, alternatively send this sign of life telegram.

Comm. Load: Cycle rate: one time Tolerance: - Bus load: 0,0%
(only in event of service)

Master /Slave Byte-No.	Abbrev.	Description	Unit	Range	Type / [Res.]	Repl. Value	Note
M 1	QQ	Source address					
M 2	ZZ = FEh	Target address (broadcast)					
M 3	PB = 07h	System commands					
M 4	SB = FFh	Sign of life					
M 5	NN = 00h	Length of data					
M 7	CRC						
M 8	SYN						

3.4 Room Controller - Room Controller Commands (Service 08h)

The service (08h) is used for communications between heater controllers and mixer modules. Slave controllers and mixer modules may transmit their target values to heater controllers by using service (08h 00h). The heater controller allots its data again as broadcast by way of service (08h 01h) and (08h 02h) respectively. Service (08h 01h) is used for effective values, service (08h 02h) for target values and error condition of the burner control units (FA Error).

Service (08h 03h) is used by the heater control for transmission of boiler temperature to the mixer modules.

3.4.1 Transmission of Target Values of the Room Controller to other Controllers (Service 08h 00h)

Name:	Transmission of Target Values of the Room Controllers to other Room Controllers (08h 00h)
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Description:	<p>Command 08h 00h may be used for room controllers in order to pass on target values. (Slave controller to Master controller)</p> <p>By means of this telegram, connected mix controllers transmit their requirements to heater controller 0. The transmitted outside temperature may be of interest for other members!</p> <p>Command call as eBUS telegram</p>
Comm. Load:	Cycle rate: 1 / 10 s Tolerance: - Bus load: 0,62%

Master/ Slave ByteNo.	Abbrev.	Description	Unit	Range	Type / [Res.]	Repl. Value	Note
M 1	QQ	Source address					
M 2	ZZ = FEh	Broadcast					
M 3	PB = 08h						
M 4	SB = 00h						
M 5	NN = 08h	Following bytes					
M 6-7	TK_target	Boiler target value	°C		DATA2b [1/256]		Low Byte first
M 8-9	TA_is	Outside temperature	°C		DATA2b [1/256]		Low Byte first outside temp.. of modules
M 10	L_compu s -1..-100% -100% 1.. 100% +100%	Forced performance Reduce power Close mixer Receive performance Control mixer to Tvmax	%		DATA1b		
M 11	Status	Status Bit 0: BWR_active Bit 1: Heater circuit_active			BIT		Bit0 = 1 ⇒ BWR_active Bit1 = 1 ⇒ Heating circuit_active
M 12-13	TB_target	Service water target value	°C		DATA2b [1/256]		Low Byte first
M 14	CRC						
M 15	SYN						

3.4.2 Operational Data of Room Controller to other Controllers (Service 08h 01h)

Name:	Operational Data of Room Controller to other Controllers (08h 01h)
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Description:	<p>Heater controller 0 transmits two effective temperatures (TK, TB), information regarding emission check and various status information by means of broadcast telegram to all bus participants. (This information is potentially useful for mix controllers, remote selectors and other auxiliary controllers.)</p> <p>Command call-up as eBUS telegram.</p>
Comm. Load:	Cycle rate: 1 / 10 s Tolerance: Bus load: 0,62 %

Master /Slave Byte-No.	Abbrev.	Description	Unit	Range	Type / [Res.]	Repl. Value	Note
M 1	QQ	Source address					
M 2	ZZ = FEh	Broadcast					
M 3	PB = 08h						
M 4	SB = 01h						
M 5	NN = 08h	Following bytes					
M 6-7	TK	Boiler_effective temperature	°C		DATA2b [1/256]		Low byte first
M 8-9	TB	Service water_effective	°C		DATA2b [1/256]		Low byte first
M 10	Emiss. 00h 01h 02h 03h 04h	Emission test No emission test Emission BR1 STB-Test with BR1 Emission test BR1+2 STB test with BR1+2			BYTE		
M 11	Status	HeatingFlags Bit0: BWR_active Bit1: Pump release µ-block Bit2: Boiler 1 in operation Bit3: Boiler 2 in operation Bit4: Loading pump runs Bit5: BW_loading runs Bit6: TBF_connect			BIT		Bit set ⇒ Statement true
M12-13	TR	Return flow temperature	°C		DATA2b [1/256]		
M 14	CRC						
M 15	SYN						

3.4.3 Master Controller to Slave Controller (Service 08h 02h)

Name: **Master Controller to Slave Controller (08h 02h)**

Description: In order to enable the heater controller 0 to convey control commands to remaining controllers, command 08h 02h is applied. Since these data are of potential interest to 3 auxiliary controllers and 8 remote actuators, this command is sent as broadcast.

Comm. Load: Cycle rate: 1 / 30 s Tolerance: Bus load: 0,19%

Master /Slave Byte-No.	Abbrev.	Description	Unit	Range	Type / [Res.]	Repl. Value	Note
M 1	QQ	Source address					
M 2	ZZ = FEh	Broadcast					
M 3	PB = 08h						
M 4	SB = 02h						
M 5	NN = 07h	Following bytes					
M 6-7	TK_target	Boiler target value	°C		DATA2b [1/256]		
M 8-9	TB_target	Service water target value	°C		DATA2b [1/256]		
M 10	L_exp -100% 0% 100%	Exp. performance deficiency No performance deficiency No target As much as possible	%		DATA1b		
M 11	FA_no Err	No. des FA			BYTE		Number of first FA with error
M 12	ERR	Error code			BYTE		Mfr.-specific
M 13	CRC						
M 14	SYN						

3.4.4 Boiler Parameters (Service 08h 03h)

Name:	Boiler Parameters (08h 03h)		
Description:	<p>Through heater controller (0), parameters are sent to all bus participants by means of broadcast telegram. Targeted bus participants are primarily the mixer controllers.</p> <p>Operations event: is transmitted when there is free channel capacity; Is actually an event and will be sent, when a parameter has changed</p> <p>Command call-up as eBUS telegram.</p>		
Comm. Load:	Cycle rate: see above	Tolerance:	Bus load: 0,0%

Master /Slave Byte-No.	Abbrev.	Description	Unit	Range	Type / [Res.]	Repl. Value	Note
M 1	QQ	Source address					
M 2	ZZ = FEh	Broadcast					
M 3	PB = 08h						
M 4	SB = 03h						
M 5	NN = 06h	Following bytes					
M 6	TK_safe	Boiler safety temperature	°C		DATA1b		
M 7	TK_supp.	Boiler support temperature	°C		DATA1b		
M 8	t_BR min	Min. burner operating time	min		BYTE		
M 9	TK_hs	Hysteresis boiler temperature	°C		DATA1b		
M 10	Flags	Flags Bit 0: boiler corrosion protection			BIT		
M 11	TRs _{MIN}	Min. return flow temperature	°C		DATA1b		
M 12	CRC						
M 13	SYN						

3.4.5 System Remote Control Controller to Controller (Service 08h 04h)

Name: System Remote Control Controller to Controller (08h 04h)

Description: This sub command is responsible for the transmission of system control commands of superior controllers. It serves to telecommand the entire system or individual heating circuits.

Comm. Load: Cycle rate: - Tolerance: - Bus load: -

Master /Slave Byte-No.	Abbrev.	Description	Unit	Range	Type / [Res.]	Repl. Value	Note
M 1	QQ	Source address					PC, modem, digital clock
M 2	ZZ	Target address					Controller 0, HK-controller
M 3	PB = 08h						
M 4	SB = 04h						
M 5	NN = 06h	Length of data					
M 6	00h 01h 11h FFh	Status system controlling: Low Nibble = WW - circuit High Nibble = heating circuit 0 = Standby with antifreeze 1 = Auto 2 = Day 3 = Night 4 = Target value day (standard operation) 5 = Target value night (Absenkbetrieb) ... F = Replacement value (without effect)			BYTE	FFh	0...3 mode of operation 4...5 set target values
M 7/8		Target value heating	°C	0-200	DATA2c	FFh	
M 9		Target value WW	°C	0-100	DATA1c	FFh	
M 10		Free				FFh	
M 11		Free				FFh	
M 15	CRC						
ZZ 16	ACK						
M 17	SYN						

This service allows separated operation-mode-control of both channels of a controller, WW and heating. Using additional bytes, the target values of the system for heating and WW can be changed if necessary.

3.5 Memory Server Commands (Service 09h)

This service enables direct access to RAM- and EEPROM-data of a module. Of course, this access may be permitted in case of service only, to prevent support of Service 09h in normal operation.

3.5.1 Reading RAM - Data (Service 09h 00h)

Name: Reading RAM – Data (09h 00h)

Description: Is only applied in case of service, one time application.
The inquiry ought to be made in slave mode.

Comm. Load: Cycle rate: one time Tolerance: - Bus load: 0,0 %

Master/ Slave ByteNo.	Abbrev.	Description	Unit	Range	Type / [Res.]	Repl. Value	Note
M 1	QQ	Source address					
M 2	ZZ	Target address (Slave)					
M 3	PB = 09h						
M 4	SB = 00h	RAM lessen					
M 5	NN = 03h	Following bytes					
M 6	LL	Low-byte start address			BYTE		
M 7	HH	High-byte start address			BYTE		
M 8	DN	Data bytes to be read		[0..10]	BYTE		This command is executed in case of service only. This to enable DNs > 10!
M 9	CRC						
S 1	ACK						
S 2	NN = DN	Sent data bytes					
S 3	Data 0	Data byte 0			BYTE		
...			
S DN+2	Data DN-1	Data byte DN - 1			BYTE		
S DN+3	CRC						
M 10	ACK						
M 11	SYN						

3.5.2 Writing RAM - Data (Service 09h 01h)

Name: Writing RAM – Data (09h 01h)

Description: Only used in case of service, one time application.
 Command call-up as eBUS telegram

Comm. Load: Cycle rate: one time Tolerance: - Bus load: 0,0 %

Master/ Slave ByteNo.	Abbrev.	Description	Unit	Range	Type / [Res.]	Repl. Value	Note
M 1	QQ	Source address					
M 2	ZZ	Target address (Slave)					
M 3	PB = 09h						
M 4	SB = 01h	Writing RAM					
M 5	NN	1<=No. of bytes as of M7<=8					
M 6	LL	Low byte of memory address (low byte address)			BYTE		Writing-address
M 7	HH	High byte of memory address (high byte address)			BYTE		
M 7+1	Data	Data Byte 0			BYTE		
M 7+..	Data	Data Byte ..			BYTE		
M 7+NN	Data	Data Byte NN – 1			BYTE		
M 7+NN+1	CRC						
S 1	ACK						
S 2	NN = 0						
S 3	CRC						
M 7+NN+2	ACK						
M 7+NN+3	SYN						

3.5.3 Reading EEPROM Data (Service 09h 02h)

Name: Reading EEPROM Data (09h 02h)

Description: Only used in case of service, one time application.
Inquiry ought to be made in slave mode.

Comm. Load: Cycle rate: one time Tolerance: - Bus load: 0,0 %

Master/ Slave ByteNo.	Abbrev.	Description	Unit	Range	Type / [Res.]	Repl. Value	Note
M 1	QQ	Source address					
M 2	ZZ	Target address (Slave)					
M 3	PB = 09h						
M 4	SB = 02h	Reading EEPROM					
M 5	NN = 03h	Following bytes					
M 6	LL	Low-byte start address			BYTE		
M 7	HH	High-byte start address			BYTE		
M 8	DN	Data bytes to be read		[0..10]	BYTE		This command is executed in case of service only. This to enable DNs > 10!
M 9	CRC						
S 1	ACK						
S 2	NN = DN	Sent data bytes					
S 3	Data 0	Data byte 0			BYTE		
...			
S DN+2	Data DN-1	Data byte DN - 1			BYTE		
S DN+3	CRC						
M 10	ACK						
M 11	SYN						

3.5.4 Writing EEPROM Data (Service 09h 03h)

Name:	Writing EEPROM Data (09h 03h)		
Description:	Is used in case of service only, one time application. Last data block may have a length of data NN < 10. Command call-up as eBUS telegram		
Comm. Load:	Cycle rate: one time	Tolerance: -	Bus load: 0,0 %

Master/ Slave ByteNo.	Abbrev.	Description	Unit	Range	Type / [Res.]	Repl. Value	Note
M 1	QQ	Source address					
M 2	ZZ	Target address (Slave)					
M 3	PB = 09h						
M 4	SB = 03h	Writing EEPROM					
M 5	NN	1<=No. of bytes as of M7<=8					
M 6	LL	Low byte of start address			BYTE		Writing-address
M 7	HH	High byte of start address			BYTE		
M 7+1	Data	Data byte 0			BYTE		
M 7+..	Data	Data byte ..			BYTE		
M 7+NN	Data	Data byte NN – 1			BYTE		
M 7+NN+1	CRC						
M 7+NN+1	CRC						
SS 1	ACK						
SS 2	NN = 00h						
SS 3	CRC						
M 7+NN+2	ACK						
M 7+NN+3	SYN						

3.6 Test Commands (Service 0Fh)

The test commands are needed in the realm of the test run for the communication between test system and test device.

Test system : software that controls and checks the test run performance

Test device : device with implemented test software

3.6.1 Start of Test Message (Service 0Fh 01h NN = 02h)

Name: Start of Test (0Fh 01h NN = 02h)

Description: This command is sent from test system to the test instrument, in order to initiate a test sequence. As response to this command, a master test unit must transmit command Ready 0Fh 01h NN = 01h.
The functions number determines the test sequence to be executed.

Comm. Load: Cycle rate: one time Tolerance: - Bus load: 0,0%

Master /Slave Byte-No.	Abbrev.	Description	Unit	Rang e	Type / [Res.]	Repl. Value	Note
M 1	QQ	Source address					
M 2	ZZ	Target address					
M 3	PB = 0Fh	Test command					
M 4	SB = 01h						
M 5	NN = 02h						
M 6	01h 02h	Test device= Master Test device = Slave			BYTE		
M 7	xxh	Functions number			BYTE		Number of test sequence to be executed. See chart 'Overview of test sequences'
M 8	CRC						

When Target address == Master Address, then:

ZZ 9	ACK						
M 10	SYN						

When Target address == Slave Address, then:

S 1	ACK						
S 2	NN = 01h						
S 3	52h	SOT received and confirmed.			BYTE		
S 4	CRC						
M 9	ACK						
M 10	SYN						

3.6.1.1 Overview over Test Sequences

Fkt. No.	Description
Test Device = Master / Test System = Master	
01h	The next received master telegram will be copied and returned to the test system as master telegram. Commands PB and SB as well as data must be copied and returned. The target address ZZ is the source address QQ of the telegram received. To close off the test sequence, the test device must send the End of Test command 0Fh 03h.
02h	The next received master telegram will be copied and sent onto the bus as broadcast telegram (ZZ=FEh). Commands PB and SB as well as data must be copied and returned. To close off the test sequence, the test device must send the End of Test command 0Fh 03h.
03h	All data bytes of the next received master telegram are added up and sent as master telegram to the test system with the command 0Fh 02H. To close off the test sequence, the test device must send the End of Test command 0Fh 03h.
07h	The next 2 received master telegrams will be copied and returned to the test system as master telegram.
08h	The next 24 received master telegrams will be copied and each will be returned to the test system as master telegram. Commands PB and SB as well as data must be copied and returned. The target address ZZ is the source address QQ of the telegram received. To close off the test sequence, the test device must send the End of Test command 0Fh 03h.
Test Device = Master / Test System = Slave	
11h	The next 24 received master telegrams will be copied and each will be returned to the test system as master telegram. The commands as well as the data must be copied and returned. The target address ZZ results from the source address QQ of the received telegram plus the firmly defined constant 05h (\Rightarrow Slave address of master. Example: received QQ = 03h \Rightarrow to be sent ZZ = QQ + 05h = 08h) The data of the subsequent slave response must be copied and returned to the master address of the test system by means of the command 0Fh 02H. To conclude the test sequence, the test unit must send the End of Test command 0Fh 03h.
14h	The next received master telegram will be copied and returned to the test system as master-slave telegram. The commands as well as the data must be copied and returned. The target address ZZ cycles through all 228 slave addresses, starting with the smallest slave address 02h. Solely those slave addresses that are occupied by the test device will be bypassed. The content of the master-slave telegrams that are to be returned are generated individually on the basis of the previously received master telegram. The data of the responding slaves must be received. To conclude the test sequence, the test unit must send the End of Test command 0Fh 03h.
Test Device = Slave / Test System = Master	
21h	The data bytes of a broadcast telegram are read and copied into the slave telegram segment of the immediately following master-slave telegram.
22h 25h	The data bytes of the master telegram part of the next received command 0Fh 02h Master – slave telegram will be copied and returned directly to the master in the slave telegram segment of the test telegram. This run will be repeated until an End of Test command 0Fh 03h (as master-slave telegram) is received.

Examples:

Test Sequence 01h / Test device is a master with address 0Fh

	AA
Start of Test	FF 0F 0F 01 02 01 01 93 00
	AA
Ready	0F FF 0F 01 01 52 E5 00
	AA AA AA AA AA
Test	FF FE 0F 02 05 01 58 58 58 58 0B
	AA
Test (copy)	0F FF 0F 02 05 01 58 58 58 58 BD 00
	AA AA AA
End of Test	0F FF 0F 03 01 59 C2 00
	AA

Test Sequence 22h / Test device is a slave

	AA
Start of Test	FF 14 0F 01 02 02 22 C8 00
	AA AA AA
Start of Test + Ready	FF 14 0F 01 02 02 22 C8 00 01 52 C9 00
	AA
Test + Response	FF 14 0F 02 02 02 A9 01 F5 00 02 02 A9 01 7C 00
	AA
End of Test	FF 14 0F 03 03 5A 5A 5A 4D 00 01 59 C2 00
	AA

xx = Telegram from test device

xx = Telegram from test system

3.6.2 Ready Message (Service 0Fh 01h NN = 01h)

Name: Ready (0Fh 01h NN = 01h)

Description: With this command, the test device reports receipt and interpretation of start command to the 'Test System'.
Comm. Load: Cycle rate: one time Tolerance: - Bus load: 0,0%

Master /Slave Byte-No.	Abbrev.	Description	Unit	Range	Type / [Res.]	Repl. Value	Note
M 1	QQ	Source address					
M 2	ZZ / BC	Target address / Broadcast					
M 3	PB = 0Fh	Test command					
M 4	SB = 01h	Ready					
M 5	NN = 01h						
M 6	Data 1=52h	OK			BYTE		
M 7	CRC						
ZZ 8	ACK						
M 9	SYN						

Example:

Test Sequence 01h / Test device is a master

Start of Test	AA FF 0F 0F 01 02 01 01 93 00 AA
Ready	0F FF 0F 01 01 52 E5 00 AA AA AA AA AA
Test	FF FE 0F 02 05 01 58 58 58 58 0B AA
Test (copy)	0F FF 0F 02 05 01 58 58 58 58 BD 00 AA AA AA
End of Test	0F FF 0F 03 01 59 C2 00 AA

xx = Telegram from test device

xx = Telegram from test system

3.6.3 Test Message (Service 0Fh 02h)

Name: **Test (0Fh 02h)**

Description: This command is always used for realisation of the test sequences.

Comm. Load: Cycle rate: one time Tolerance: - Bus load: 0,0%

Master/ Slave ByteNo.	Abbrev.	Description	Unit	Range	Type / [Res.]	Repl. Value	Note
M 1	QQ	Source address					
M 2	ZZ	Target address					
M 3	PB = 0Fh	Test command					
M 4	SB = 02h						
M 5	NN	00h ≤ NN ≤ 10h					
M 5+1		Data bytes			BYTE		
M 5+..		Data bytes			BYTE		
M 5+NN		Data bytes			BYTE		
M 5+NN+1	CRC						

When Target address == Master-Address, then:

ZZ 5+NN+2	ACK						
M 5+NN+3	SYN						

When Target address == Slave-Address, then:

S 1	ACK						
S 2	NN	NN Slave = NN Master					
S 2+1		Data bytes Slave = Data bytes Master			BYTE		
S 2+..		Data bytes Slave = Data bytes Master			BYTE		
S 2+NN		Data bytes Slave = Data bytes Master			BYTE		
S 2+NN+1	CRC						
M 5+NN+4	ACK						
M 5+NN+5	SYN						

Examples:

Test Sequence 01h / Test device is a master

Start of Test	AA FF 0F 0F 01 02 01 01 93 00 AA
Ready	0F FF 0F 01 01 52 E5 00 AA AA AA AA AA
Test	FF FE 0F 02 05 01 58 58 58 58 0B AA
Test (copy)	0F FF 0F 02 05 01 58 58 58 58 BD 00 AA AA AA
End of Test	0F FF 0F 03 01 59 C2 00 AA

Test Sequence 22h / Test device is a slave

Start of Test (Fkt=22h)	AA FF 14 0F 01 02 02 22 C8 00 AA AA AA
Start of Test + Ready	FF 14 0F 01 02 02 22 C8 00 01 52 C9 00 AA
Test + Response	FF 14 0F 02 02 02 A9 01 F5 00 02 02 A9 01 7C 00 AA
End of Test	FF 14 0F 03 03 5A 5A 5A 4D 00 01 59 C2 00 AA

xx = Telegram from test device
 xx = Telegram from test system

3.6.4 End of Test Message (Service 0Fh 03h)

Name: End of Test (0Fh 03h)

Description: With this command, the test device reports, if the test sequence has been successfully conducted. The parameter indicates the test result.
Comm. Load: Cycle rate: one time Tolerance: - Bus load: 0,0%

Master /Slave Byte-No.	Abbrev.	Description	Unit	Range	Type / [Res.]	Repl. Value	Note
M 1	QQ	Source address					
M 2	ZZ	Target address					
M 3	PB = 0Fh	Test command					
M 4	SB = 03h						
M 5	NN = 01h						
M 6	59h ≠ 59h	Test successful Error			BYTE		
M 7	CRC						

When Target Address == Master-Address, then:

ZZ 8	ACK						
M 9	SYN						

When Target Address == Slave-Address, then:

S 1	ACK						
S 2	NN = 1						
S 3	59h	EOT confirm			BYTE		
S 4	CRC						
M 10	ACK						
M 11	SYN						

Example:

Test Sequence 01h / Test device is a master

Start of Test	AA FF 0F 0F 01 02 01 01 93 00 AA
Ready	0F FF 0F 01 01 52 E5 00 AA AA AA AA AA
Test	FF FE 0F 02 05 01 58 58 58 58 0B AA
Test (copy)	0F FF 0F 02 05 01 58 58 58 58 BD 00 AA AA AA
End of Test	0F FF 0F 03 01 59 C2 00 AA

Test Sequence 22h / Test device is a slave

Start of Test	AA FF 14 0F 01 02 02 22 C8 00 AA AA AA
Start of Test + Ready	FF 14 0F 01 02 02 22 C8 00 01 52 C9 00 AA
Test + Response	FF 14 0F 02 02 02 A9 01 F5 00 02 02 A9 01 7C 00 AA
End of Test	FF 14 0F 03 03 5A 5A 5A 4D 00 01 59 C2 00 AA

xx = Telegram from test device
xx = Telegram from test system

3.7 General Broadcast Messages

3.7.1 Error Message (Service FEh 01h)

Name: **Error Message (FEh 01h)**

Description: This broadcast message serves as error message, it may be issued once only by each device in case of error. This message is designed to be passed on by way of an eBus modem, in order to inform the service centre of the occurrence of an error.

Comm. Load: Cycle rate: one time Tolerance: - Bus load: 0,0%
(only in case of service)

Master /Slave Byte-No.	Abbrev.	Description	Unit	Range	Type / [Res.]	Repl. Value	Note
M 1	QQ	Source address					
M 2	ZZ = FEh	Target address (broadcast)					
M 3	PB = FEh	General broadcast message					
M 4	SB = 01h	Error message					
M 5	NN = 0Ah	No. of following bytes					
M 6-15	DB1-10	10 characters for the error message			CHAR		
M 16	CRC						
ZZ 17	ACK						
M 18	SYN						

3.8 Network Management Messages

3.8.1 Reset Status NM (Service FFh 00h)

Name: **Reset NM (FFh 00h)**

Description: The network management of a participant issues this broadcast message, after he has been connected with the bus.
Following receipt of this message, the network management of already existing participants sets status chart, net status and internal variables of the network management implementation to the default values.
In case of utilisation of a target configuration that is to be generated dynamically during operation, it will be set to its default values, provided they have not yet been generated.
(See Specification Network Management)

Comm. Load: Cycle rate: one time Tolerance: - Bus load: 0,0%

Master /Slave Byte-No.	Abbrev.	Description	Unit	Range	Type / [Res.]	Repl. Value	Note
M 1	QQ	Source address					
M 2	ZZ = FEh	Target address (broadcast)					
M 3	PB = FFh	Network management message					
M 4	SB = 00h	Reset Status NM					
M 5	NN = 00h	No. of following bytes					
M 6	CRC						
M 7	SYN						

3.8.2 Reset Target Configuration NM (Service FFh 01h)

Name: **Reset Target Configuration NM (FFh 01h)**

Description: Upon receipt of this broadcast message, the network management of already existing participants sets status chart, net status and internal variables to their default values.
 In case of utilisation of a target configuration that is to be generated dynamically during operation, an already existing target configuration will be erased to its default values.
 (See Specification Network Management)

Comm. Load: Cycle rate: one time Tolerance: - Bus load: 0,0%

Master /Slave Byte-No.	Abbrev.	Description	Unit	Range	Type / [Res.]	Repl. Value	Note
M 1	QQ	Source address					
M 2	ZZ = FEh	Target address (broadcast)					
M 3	PB = FFh	Network management message					
M 4	SB = 01h	Reset target configuration NM					
M 5	NN = 00h	No. of following bytes					
M 6	CRC						
M 7	SYN						

3.8.3 Failure Message (Service FFh 02h)

Name:	Failure Message (FFh 02h)		
Description:	<p>This broadcast message will be issued by the network management, immediately upon discovery of failure of a participant. This message may be sent cyclically with a minimum separation of 15 minutes, for as long as a monitored node remains recognised as failed.</p>		
Comm. Load:	Cycle rate: s. Description	Tolerance: -	Bus load: 0,0%

Master /Slave Byte-No.	Abbrev.	Description	Unit	Range	Type / [Res.]	Repl. Value	Note
M 1	QQ	Source address					
M 2	ZZ = FEh	Target address (Broadcast)					
M 3	PB = FFh	Network management message					
M 4	SB = 02h	Failure message					
M 5	NN = 00h	No. of following bytes					
M 6	CRC						
M 7	SYN						

3.8.4 Interrogation Net Status (Service FFh 03h)

Name: Interrogation Net Status (FFh 03h)

Description: This service is used for interrogation of effective net status of a participant (master of the addressed slaves).
Based on request, the accosted participant sends a byte that contains the information described below.

Comm. Load: Cycle rate: one time Tolerance: - Bus load: 0,0%

Master /Slave Byte-No.	Abbrev.	Description	Unit	Rang e	Type / [Res.]	Repl. Value	Note
M 1	QQ	Source address					
M 2	ZZ	Target address (slave address of master to be interrogated)					
M 3	PB = FFh	Network management message					
M 4	SB = 03h	Net status					
M 5	NN = 00h	No. of following bytes					
M 6	CRC						
S 1	ACK						
S 2	NN = 01h	No. of following bytes					
S 3		Bit1 = 1 Net status OK Bit2 = 1 Start flag set			BIT		As long as start flag is set, the max. to be monitored cycle time has not expired. Therefore, the status of a node may still be set to OK by default (following a reset)
M 7	ACK						
M 8	SYN						

3.8.5 Interrogation of monitored Participants (Service FFh 04h)

Name: **Interrogation of monitored Participants (FFh 04h)**

Description: This telegram serves for interrogation of effective status chart with respective addresses of the monitored network management participants of a participant (master of addressed slave).

The interrogation of the monitored participants makes sense when the network management has signalled failure of at least one node by means of a failure message (FFh 02h) or statement in its net status report (FFh 03h).

Comm. Load: Cycle rate: one time Tolerance: - Bus load: 0,0%

Master /Slave Byte-No.	Abbrev.	Description	Unit	Rang e	Type / [Res.]	Repl. Value	Note
M 1	QQ	Source address					
M 2	ZZ	Target address (slave address of to be interrogated master)					
M 3	PB = FFh	Network management message					
M 4	SB = 04h	Interrogate status chart					
M 5	NN = 01h	No. of following bytes					
M 6	BlockNo.	0 = Selection of max. first 8 monitored nodes and respective status 1 = Selection of subsequent 8 monitored nodes and respective status ...			CHAR		
M 7	CRC						
S 1	ACK						
S 2	NN =01-0Ah	No. of following bytes					At NN > 1 applies: NN - 2 gives number of transmitted monitored nodes
S 3	FollowBlock / BlockNo.	Bit 0..4 = No. of needed blocks to interrogate the entire status chart Bit 5..6 = reserved Bit 7 = indicates, if the status chart has been fully read (= 0), or if there remain any data (= 1)			BIT		

S 4	NMStatus	Bit 0..8 = Status of respective address that is indicated in following data bytes 0 = node not OK 1 = node OK Bit 0 = Status of participant address in S5 Bit 1 = Status of participant address in S6			BIT		
S 5		Member address of node that is monitored by the master			CHAR		
S 6		Member address of a node that is monitored by the master			CHAR		
...					
S n	CRC						
M 8	ACK						
M 9	SYN						

3.8.6 Interrogation of failed Nodes (Service FFh 05h)

Name:	Interrogation of failed Nodes (FFh 05h)		
Description:	<p>This telegram serves for interrogation of currently as not OK designated member addresses of the network management pertaining to a participant (master of addressed slaves).</p> <p>The interrogation of failed nodes may be useful when the network management has signalled by failure message (FFh 02h) or in its net status report (FFh 03h) that at least one node has failed. (See Specification Network Management)</p>		
Comm. Load:	Cycle rate: one time	Tolerance: -	Bus load: 0,0%

Master /Slave Byte-No.	Abbrev.	Description	Unit	Range	Type / [Res.]	Repl. Value	Note
M 1	QQ	Source address					
M 2	ZZ	Target address (slave address of to be interrogated master)					
M 3	PB = FFh	Network management message					
M 4	SB = 05h	Interrogation of failed nodes					
M 5	NN = 01h	No. of following bytes					
M 6	BlockNo.	0 = Selection of max. first 9 failed nodes 1 = Selection of subsequent 9 failed nodes ...			CHAR		
M 7	CRC						
S 1	ACK						
S 2	NN =01-0Ah	No. of following bytes					At NN > 1 applies: NN - 2 results in number of reported failed nodes
S 3	FollowBlock / NoBlocks.	Bit 0..4 = No. of blocks needed to interrogate all failed blocks Bit 5..6 = reserved Bit 7 = indicates if all failed blocks have been read (= 0), or if there are any remaining data (= 1)			BIT		
S 4		Member address of a failed node			CHAR		
S 5		Member address of a failed node			CHAR		
...					
S n	CRC						
M 8	ACK						
M 9	SYN						

3.8.7 Interrogation of required Services (Service FFh 06h)

Name:	Interrogation of required Services (FFh 06h)		
Description:	<p>This telegram serves for required services by a member from which the target configuration of the network management is generated dynamically (master of addressed slaves).</p> <p>This telegram is applicable only for members who generate their target configuration dynamically.</p>		
Comm. Load:	Cycle rate: one time	Tolerance: -	Bus load: 0,0%

Master /Slave Byte-No.	Abbrev.	Description	Unit	Range	Type / [Res.]	Repl. Value	Note
M 1	QQ	Source address					
M 2	ZZ	Target address (slave address of to be interrogated master)					
M 3	PB = FFh	Network management message					
M 4	SB = 06h	Interrogation of required services					
M 5	NN = 01h	No. of following bytes					
M 6	BlockNo.	0 = Selection of max. first 4 required services 1 = Selection of subsequent 4 required services ...			CHAR		
M 7	CRC						
S 1	ACK						
S 2	NN =01-0Ah	No. of following bytes					At NN > 1 applies: (NN - 2)/2 yields the number of transmitted services
S 3	FollowBlock / BlockNo.	Bit 0..4 = No. of blocks needed to interrogate all required services Bit 5..6 = reserved Bit 7 = indicates if all required services have been read (= 0), or if there exist any further services (= 1)			BIT		
S 4		PB of first required service			CHAR		
S 5		SB of first required service			CHAR		
...					
S n	CRC						
M 8	ACK						
M 9	SYN						

4 Appendix

4.1 Primary Command Definition

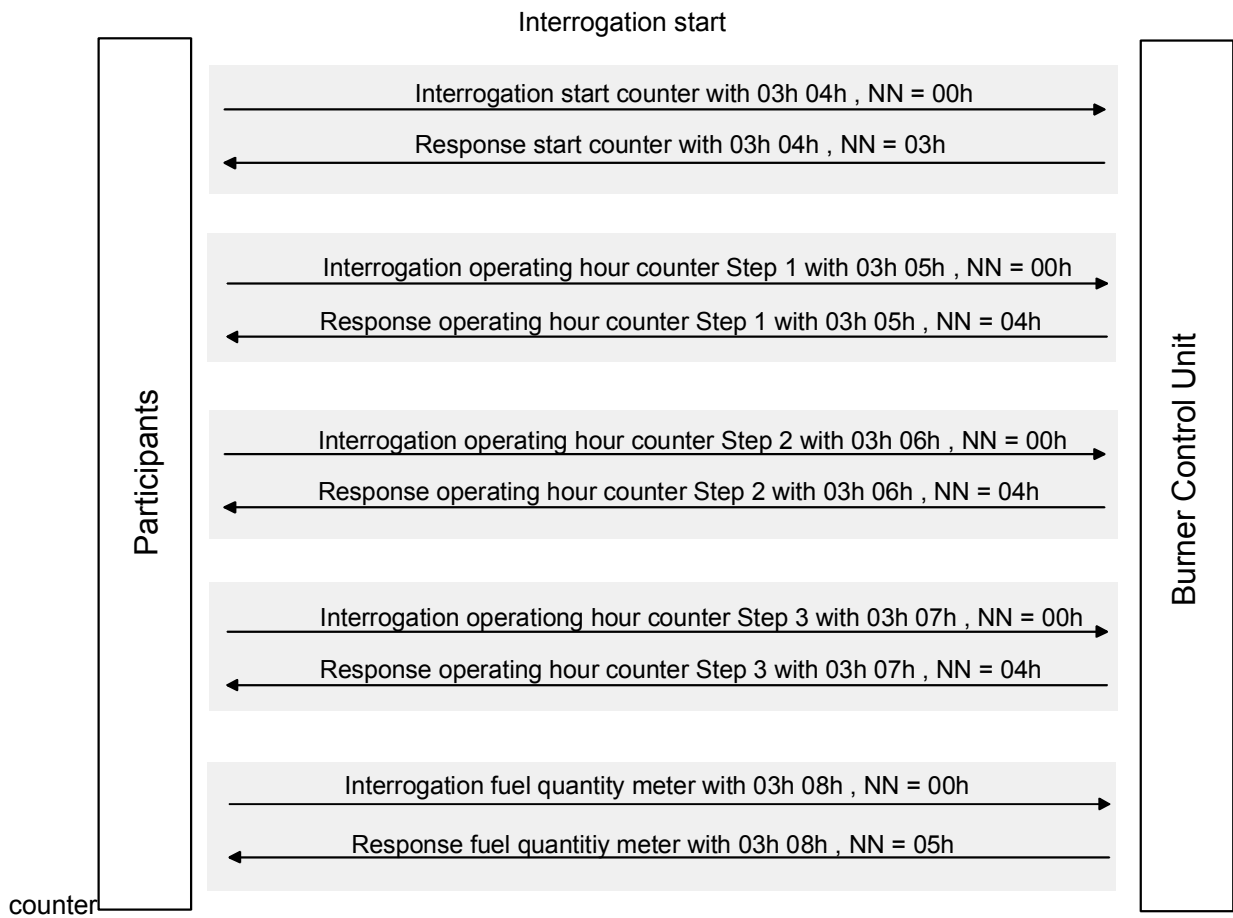
The effective primary command definition is found under Appendix to Specification Layer 7 V1.4 or found under www.eBUS.de respectively.

4.2 Index of Abbreviations:

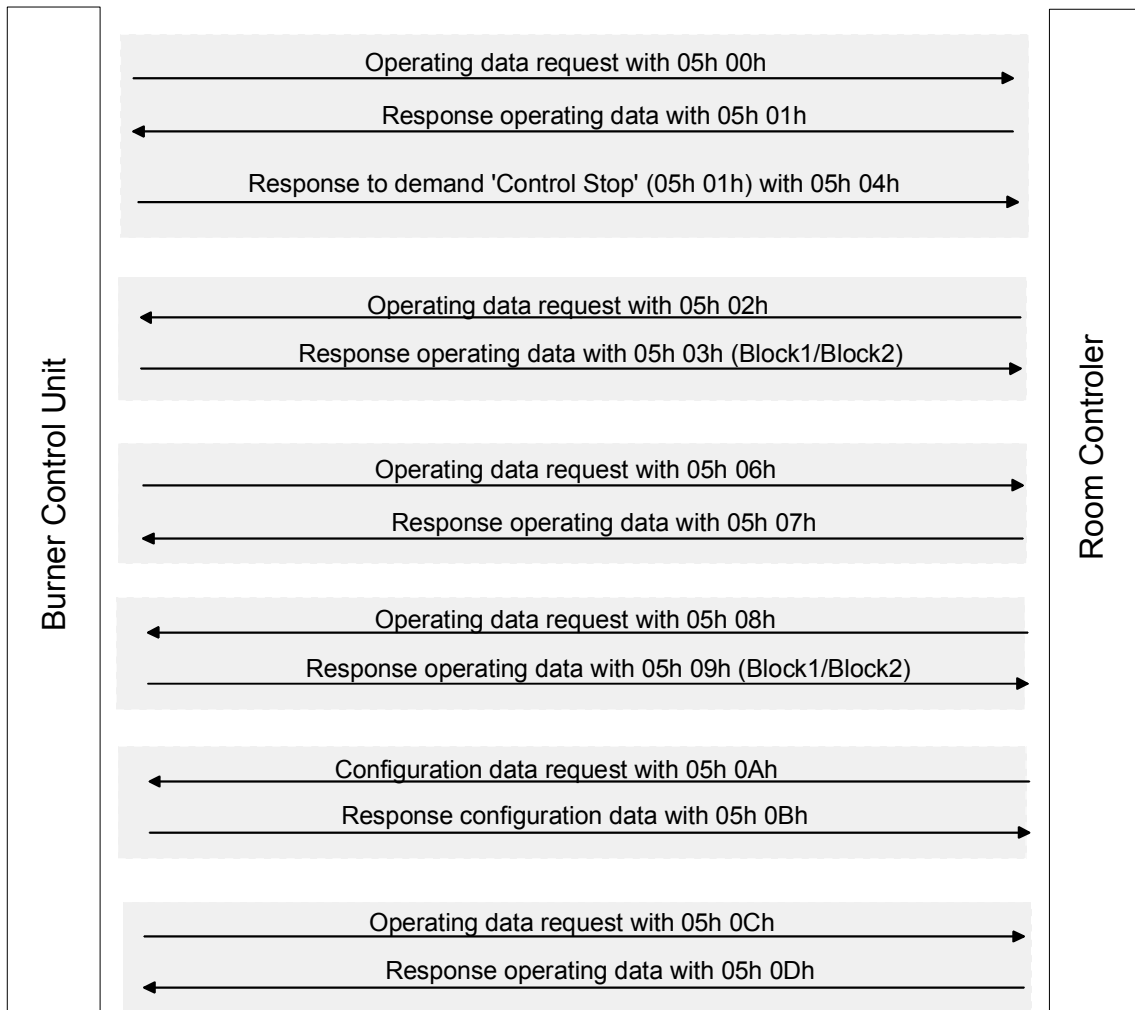
Aufl.	Resolution
b	Binary
BT	Boiler temperature
BW	Service water
BW_aktive	Service water controller active
BW_load	Service water load
BW_pref.	Service water precedence
BWR	SW controller
FA	Burner control unit
GDW	Gas pressure monitor
GLT	Building technology
h	Hexadecimal presentation
HZR	Heater control unit
K	Boiler temperature
NM	Network management
LDW	Air pressure monitor
L_exp	Desired performance demand
RT	Return flow temperature
TA_valid	Outside temperature
TA_H	Outside temperature
TA_L	Outside temperature
T_BR min	Min. burner run time
TB	Service water effective temperature
TBF	Temperature Service water sensor
TB_target	Service water target value
TK	Boiler effective temperature
TK_hys	Boiler temperature hysteresis
TK_target	Boiler temperature target value
TK_support	Boiler temperature support value
UWP	Re-circulation pump
WS	Water flow sensor (flow yes/no)

4.3 Graphic Presentation of Communications over eBUS by means of specified Commands

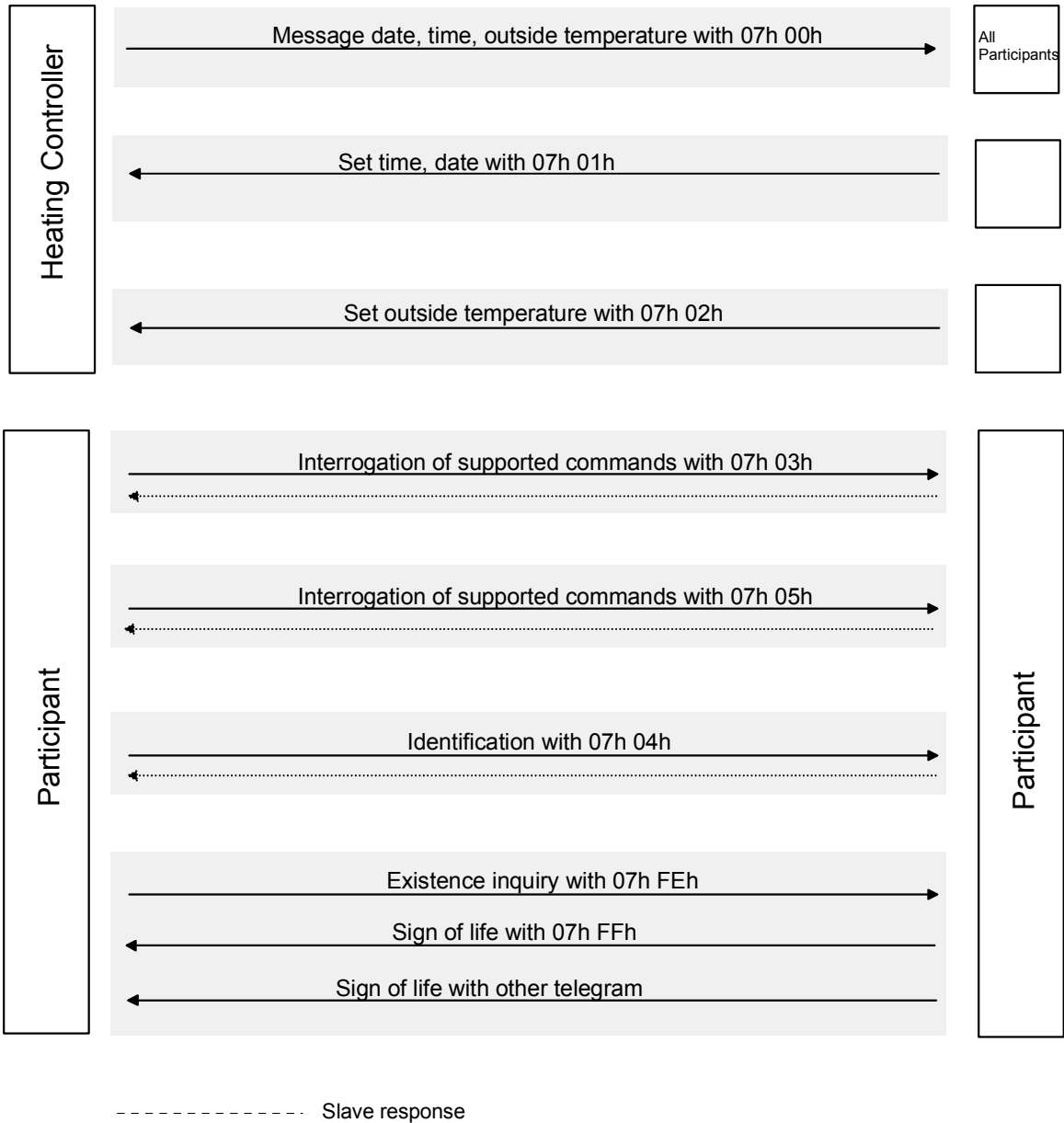
4.3.1 Graphic Presentation of Communications over eBUS with Service 03h



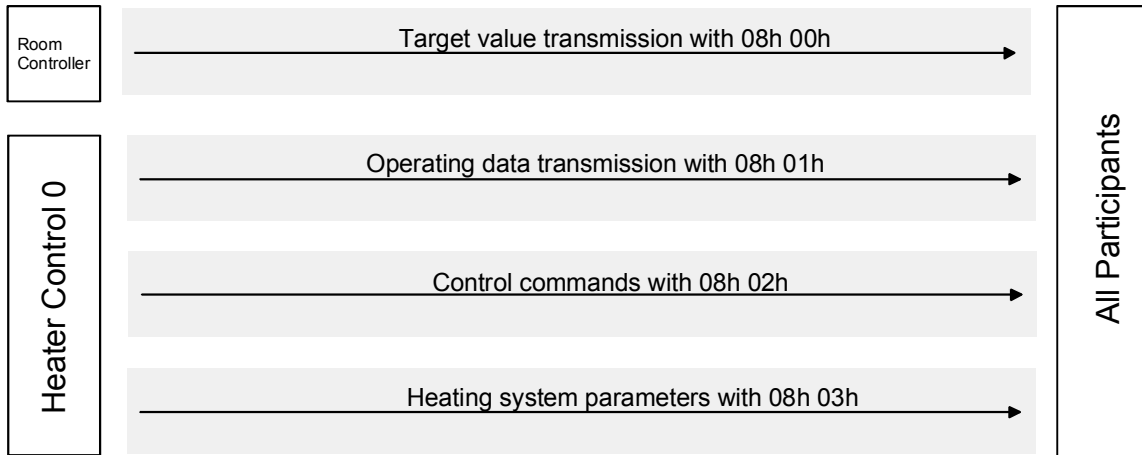
4.3.2 Graphic Presentation of Communications over eBUS with Service 05h



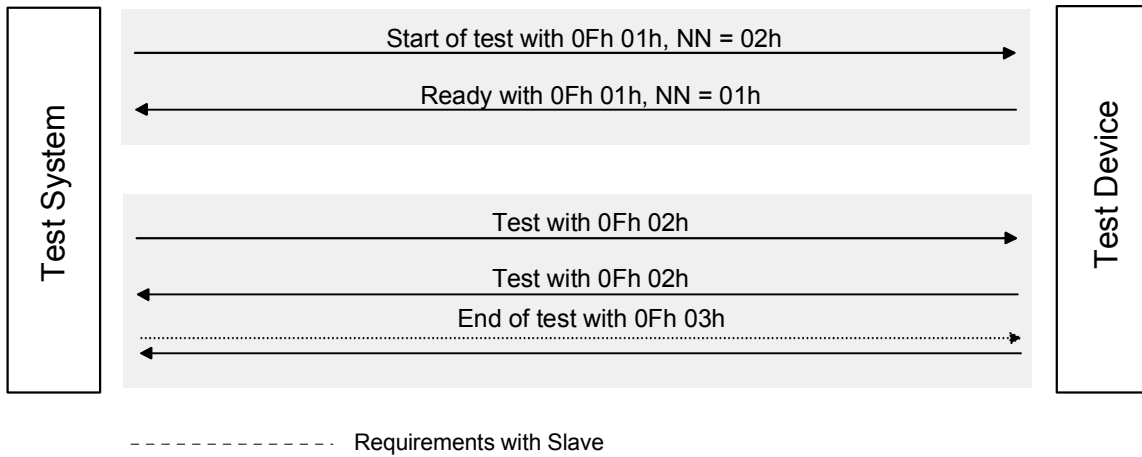
4.3.3 Graphic Presentation of Communications over eBUS with Service 07h



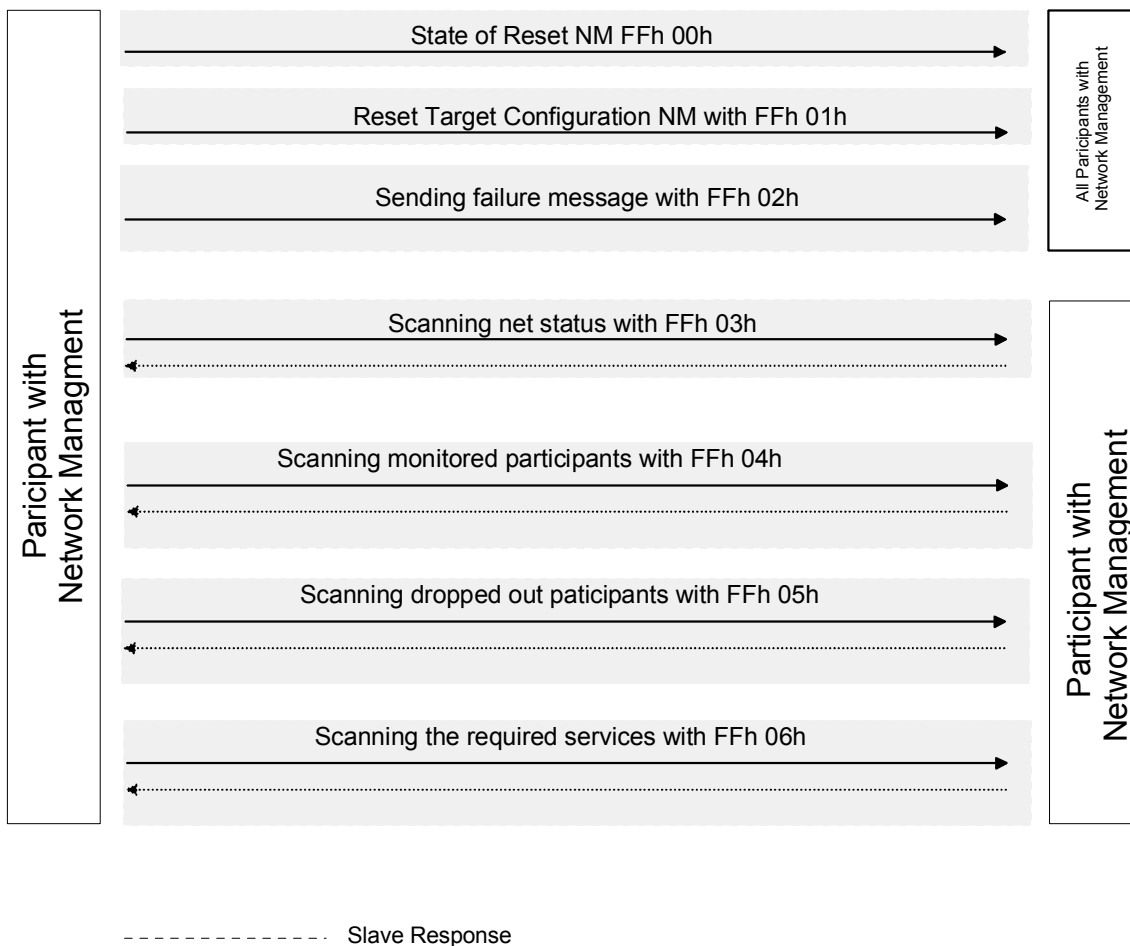
4.3.4 Graphic Presentation of Communications over eBUS with Service 08h



4.3.5 Graphic Presentation of Test Commands (Service 0Fh)



4.3.6 Graphic Presentation of Network Management Messages (Service FFh)



5 List of Modifications

5.1 Editorial Modifications Version 1.2 → Version 1.3

Date	Page V1.2	Page V1.3	Description	Author
09 / 1999	3	4	Corrections Picture No. 1	M. Scheurer
	4	Appendix / Page 3	Assignment of master addresses transferred to auxiliary document (Appendix)	
	6	7	Editorial modifications Introduction of the new data type DATA2c	
	7ff	8ff	Expansion by Services 03h 04h to 03h 08h	
	10	16	Expansion of note to M7	
	11	17	Expansion by Service 05h 03h Block 2	
	12	19ff	Expansion by Services 05h 06h to 05h 09h Block 2	
	13	25	Supplements ref. M15 and M16	
	17	29	Transferring manufacturer coding in supplement document (Appendix)	
	18	30	Expansion by Service 07h 05h	
	20	33	Complementing M11 by definition of Bit1	
	23	36	Supplementation ref. M11	
	35	50	Expansion ref. Service FEh 01h	
	35	51	Transferring primary definition in complement document (Appendix)	
	End	52ff	Expansion by graphic presentation of communication over eBUS by means of specified commands	
	End	57	Expansion by list of modifications	
	General		Editorial changes New layout Structural modifications Standardising headings Barring Service 05h 05h	Frank Fischer

5.2 Editorial Modifications Version 1.3 → Version 1.3.1

Date	Page V1.3	Page V1.3.1	Description	Author
02 / 2000	17	17	Correction of error in Service 05h 03h Block 2	Frank Fischer
02 / 2000	--	General	Editorial modification: Adopting name of Service in headings	

5.3 Editorial Modifications Version 1.3.1 → Version 1.4

Date	Page V1.3.1	Page V1.4	Description	Author
05 / 2000	4	4	Adaptation of system overview	Frank Fischer Maria Scheurer
	52ff	52ff	Introduction of Services FFh 00h – FFh 06h (Network management messages)	
	25ff	25ff	Expansion by Services 05h 0Ah - 05h 0Dh	
	53ff	62ff	Adaptation of graphic presentation of Services	
	5	5	Expansion by chapter Communications Load (Descriptions)	
	Appendix	Appendix	Expansion assignment of master addresses Revision of values ref. communications load throughout document	

5.4 Editorial Modifications Version 1.4 → Version 1.5

Date	Page V1.4	Page V1.5	Description	Author
08 / 2000	Complete document		Editorial modifications: Erasure of replacement values in Service-definitions, if they do not deviate from the definition on page 7.	Frank Fischer Maria Scheurer
	7	7	Editorial modification: Descriptive comment on replication values	
	23	23	Additions to 05h 09h	
09 / 2000	Complete document		Editorial modification: Correction of the spelling of the data type BIT	Sven-Uwe Landvoigt

Date	Page V1.4	Page V1.5	Description	Author
01 / 2001	35 55	35 55	SB von 03h in 05h korrigiert M17 : ACK durch SYN ersetzt und M18 entfernt	Maria Scheurer
02 / 2001	8 to 12	8 9 to 13	Added: Chapter 2.4.2.2 Predefinitions substitute notes on replacement values. Services 03h 04h to 03h 08h: Added: the term 'complete' to the headlines Added: Read Meter Reading (Service 03h 10h)	Sven-Uwe Landvoigt
02 / 2001	21 23	14 24 26 14 and 15 14 and 15 25	Definition M14 'election of fuel' in Service 05h 07h amended. Notes on M10 amended. Incorporate notes on the description of meter digits at the data bytes S3 to S6 and M6 to M8 respectively. Expansion of response data bytes by the bytes 'type of meter' and 'amount of fuel'. Correction of unit and data type of M13 in '°C' and 'DATA1c'	Sven-Uwe Landvoigt

5.5 Editorial Modifications Version 1.5 → Version 1.5.1

Date	Page V1.5	Page V1.5.1	Description	Author
07 / 2001	10 14 40	10 14 40	Korrigieren der Befehlsüberschrift Added: in M 6 type of meter : 05 = modulating operation Correction of the description for M7: Block 2 : PB10h to PB17h Block 3 : PB18h to PB1Fh	Frank Fischer

5.6 Editorial Modifications Version 1.5.1 → Version 1.5.2

Date	Page V1.5.1	Page V1.5.2	Description	Author
04 / 2002	34, 35	34, 35	Substitution of the term "heating controller" in the description of the commands 07h 00h and 07h 01h by the term "eBUS Master".	Frank Fischer



5.7 Editorial Modifications Version 1.5.2 → Version 1.5.3


Date	Page V1.5.2	Page V1.5.3	Description	Author
07 / 2002	17	17	Modification range of values: Service 05h 01h New range of values: M7 : 0..100°C	Frank Hoffmann
07 / 2002	17	17	Modification range of values: Service 05h 01h New range of values: M9: -50°C..+50°C	Frank Hoffmann
10 / 2002	29	29	Modification data bytes M7,M8 New domain: 0-25%(Data2b[1/256]) Sent measured value at invalid measurement: 0x7FFF	Frank Hoffmann
10 / 2002	--	30	Added: Operation modes of the automatic firing device to controller block 3(Service 05h 09h Block 3)	Frank Hoffmann

5.8 Editorial Modifications Version 1.5.3 → Version 1.6

Date	Page V1.5.3	Page V1.6	Description	Author
08 / 2004	27	27	Modification of cycle rate Service 05h 09h Block 1 New range of values: 1 / 1 s Default 1/ 10 s Thereby also modification of Busload: 7,0%	Maike Haug
08 / 2004	--	48	Added: System Remote Control Controller to Controller (Service 08h 04h)	Maike Haug

5.9 Editorial Modifications Version 1.6 → Version 1.6.1

Date	Page V1.6	Page V1.6.1 footnote	Description	Author
03 / 2007			Change of the footnote from © User Club eBUS e.V.  www.eBUS.de to © eBUS Interest Group  www.eBUS.de	Frank Hoffmann

© eBUS Interest Group  www.eBUS.de	eBUS Specifications Application Layer – OSI 7	Version 1.6.1	Issue 03 / 07	Page 80
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