

unique automation

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Project number:

Project name: **Bathomatic to LAN Gateway**

Doc type: **Design process**

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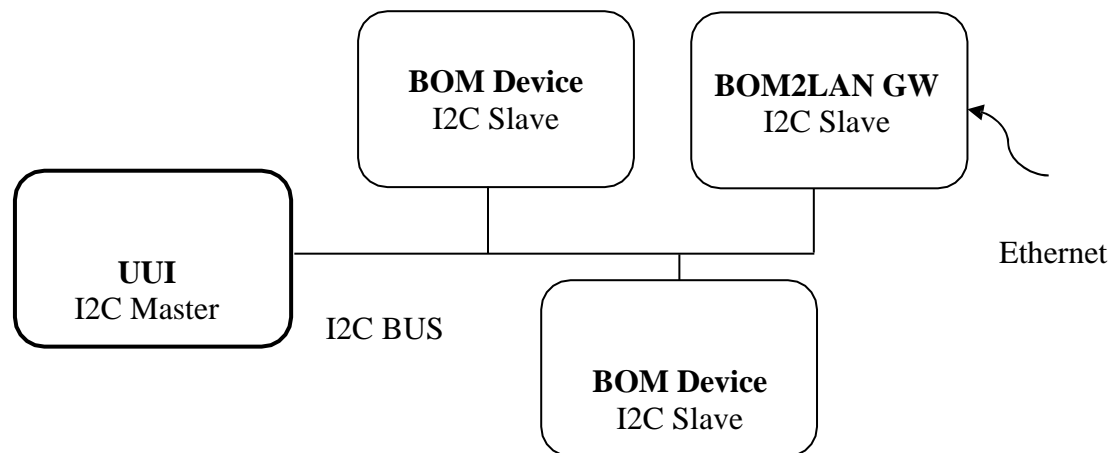
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Changes

Version	Date	Author	Description
1.0.1.4	09/05/21	PG	Added Error Code field to 0x01 command
1.0.1.3	14/05/14	PG	Changed 0x02 command
1.0.1.2	13/05/14	PG	Changed 0x72 reply
1.0.1.1	06/05/14	PG	Changed 0x01 reply
1.0.0.9	05/05/14	PG	Changed 0x01 frame, removed shower fields
1.0.0.8	01/05/14	PG	Added Shower presets
1.0.07	29/04/14	PG	Extended Shower settings, added 0x02 command
1.0.0.6	09/04/14	PG	Added Setting Restore command
1.0.0.5	20/01/14	PG	Added version fields to 0x01 command
1.0.0.4	02/01/14	PG	Added Frame Description
1.0.0.3	15/07/13	PG	Fixed Dispensers data
1.0.0.2	01/07/13	PG	Added dispensers
1.0.0.1	16/05/13	PG	First Draft

System Overview



Device Requirements

1. Minimal requirement
 - 1.1 Unit has to work as an optional addition to the system
 - 1.2 Device must work in slave configuration with ability to change main unit, UUI, setting triggered by a user via network interface
2. Additional requirements (to be verified)
 - 2.1 Device should have an ability to have network configured via UUI

I2C Protocol Description

Communication principles

Based on KISS protocol

SYNC	Length	Target	Command		Data	Checksum	SYNC
0xC0	0	1	High	Low	0...n	n+5	0xC0
-1			2	3	4..n+4		n+6

Length = header (3) + data(n) + crc(1) = 4+n

Checksum =

$(\text{bitwiseNOT}(\text{bitwiseAND}((\text{Length} + \text{Target} + \text{Command} + \sum_{i=0}^n \text{Data}[i]), 0xff))) + 1$

Escaping

0xC0 -> 0xDB 0xDC

0xDB -> 0xDB 0xDD

Frame definitions

Design Note: Most of the frames base on BOM2 Ethernet protocol.

Commands

Command Number	Description
0x01	Current state of the system
0x02	Set Shower
0x03	Set Bath Preset values
0x04	Set Dispenser
0x05	Restore Settings
0x06	Shower Preset

Queries

Query Number	Description
0x71	Current state – bath
0x72	Current state – shower
0x73	Read Bath Preset values
0x74	Read Dispenser
0x76	Shower Preset

Commands Definitions

Current state of the system

Type: 0x01

Command:

Bath, Current Temperature [0.1°C]		Bath, Water Level 0-100 [%]	Bath, State [empty=0, emptying=1, pause=2, filling=3, filled=4]	Bath, Desired Temperature [0.1°C]	
MSB	LSB			MSB	LSB
0	1	2	3	4	5

Bath, Desired Water Level 0-100 [%]	Bath, Active Preset [0-manual settings, 1-9]	Bath, plug state [open=0, close=1]
6	7	8

Error Code	Firmware Version	
	MSB	LSB
9	10	11

Error Code Field Description:

Error code	Error description
0	NO ERRORS
1	VBUS ERROR
2	MIXER A 1 NO REPLY
3	MIXER A 2 NO REPLY
4	MIXER A 3 NO REPLY
5	MIXER A 4 NO REPLY
6	MIXER A 5 NO REPLY
7	MIXER A 6 NO REPLY
8	MIXER A 7 NO REPLY
9	MIXER A 8 NO REPLY
10	MIXER A 9 NO REPLY
11	MIXER A 10 NO REPLY
12	MIXER A 11 NO REPLY
13	MIXER A 12 NO REPLY
14	MIXER M 1 INVALID NUMBER OF VALVES
15	MIXER M 1 NO REPLY
16	MIXER M 1 INVALID VALVE 1 STATE
17	MIXER M 1 INVALID VALVE 2 STATE
18	MIXER M 1 INVALID VALVE 3 STATE
19	MIXER M 1 INVALID VALVE 4 STATE
20	MIXER M 1 INVALID TEMPERATURE
21	MIXER M 2 INVALID NUMBER OF VALVES
22	MIXER M 2 NO REPLY
23	MIXER M 2 INVALID VALVE 1 STATE
24	MIXER M 2 INVALID VALVE 2 STATE
25	MIXER M 2 INVALID VALVE 3 STATE
26	MIXER M 2 INVALID VALVE 4 STATE
27	MIXER M 2 INVALID TEMPERATURE
28	MIXER M 3 INVALID NUMBER OF VALVES
29	MIXER M 3 NO REPLY
30	MIXER M 3 INVALID VALVE 1 STATE
31	MIXER M 3 INVALID VALVE 2 STATE
32	MIXER M 3 INVALID VALVE 3 STATE
33	MIXER M 3 INVALID VALVE 4 STATE
34	MIXER M 3 INVALID TEMPERATURE
35	BOM TOG HEATER COMTROL FAILED
36	BOM TOG PLUG CLOSING ERROR
37	BOM TOG COMMUNICATION ERROR
38	BOM TOG TEMPERATURE ERROR
39	BOM TOG BATHTUB NOT CALIBRATED

Reply:

Bath Presets		Current State	Dispensers		Shower Presets		Shower States	
0	1	2	3	4	5	6	7	8

Field Description:

- Preset Update Request

Update Request	Set to 0							9	8	7	6	5	4	3	2	1
	Preset change															
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	

Preset flag set high for a preset that was updated via LAN interface and needs to be send to the UUI, flag for changed preset is reset after Read Bath Preset query is executed for changed preset.

Update Request Flag is set if BOM2LAN needs bath preset update, set high after BOM2LAN reset.

- Current state update

Update								Bath
Bit	7	6	5	4	3	2	1	0

Bath flag is set if user requested changes in their states. The flag is reset once current state frame is executed

- Dispensers

Update Request	Set to 0							12	11	10	9	8	7	6	5	4	3	2	1
	Dispenser change																		
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0				

Dispenser flag set high for a dispenser that was updated via LAN interface and needs to be send to the UUI, flag for changed dispenser is reset after Read Dispenser query is executed for changed dispenser.

Update Request Flag is set if BOM2LAN needs bath Dispenser state update, set high after BOM2LAN reset.

- Shower Presets

Update Request	Set to 0								8	7	6	5	4	3	2	1
									Shower Preset change							
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	

Shower preset change flags are set once particular shower preset was updated by a BOM2LAN. Update Request is set high if all presets need updated, set high after BOM2LAN reset

- Shower States

Update Request	Set to 0								8	7	6	5	4	3	2	1
									Shower state change							
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	

Each of the shower flags is set if updating is needed, reset after Current state – shower command is executed for flagged showers, all flag are set after reset.

Current state – shower

Type: 0x02

Command:

Shower Number [0-7]	Shower, desired Temperature [0.1°C]		Shower, state [on=0,off=1]	Shower, Water Desired Flow [1-7]
0	MSB 1	LSB 2	3	4

Shower, Current Temperature [0.1°C]		Shower, Water Current Flow [0-7]
MSB 5	LSB 6	7

Reply:

ACK
0

Set Bath Preset values

Type: 0x03

Preset Number	Bath, desired Temperature [0.1°C]		Bath, desired Water Level 0-100 [%]
0	MSB 1	LSB 2	3

Dispenser 1 0-100	Dispenser 2 0-100	Dispenser 3 0-100	Dispenser 4 0-100	Dispenser 5 0-100	Dispenser 6 0-100
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4	5	6	7	8	9
---	---	---	---	---	---

Dispenser 7 0-100	Dispenser 8 0-100	Dispenser 9 0-100	Dispenser 10 0-100	Dispenser 11 0-100	Dispenser 12 0-100
10	11	12	13	14	15

Preset Name
16..n

Field Description:

Preset name follows the preset settings without string termination character

Reply:

ACK
0

Set Dispenser

Type: 0x04

Query:

Dispenser Number	Drops [0-100]	Dispenser Name
0	1	2..n

Reply:

ACK = 0 NACK = 1
0

Field Description:

- Dispenser Name

Dispenser name follows the dispenser settings without string termination character

Settings Restore

Type: 0x05

Query:

No data

Reply:

ACK = 0 NACK = 1
0

ShowerPreset

Type: 0x06

Command:

Preset Number [1-9]
0

Valve 1		Valve 2		Valve 3		Valve 4	
1	2	3	4	5	6	7	8

Valve 5		Valve 6		Valve 7		Valve 8	
9	10	11	12	13	14	15	16

Preset Name
17 .. 37

Reply:

ACK
0

Field Description:

- **Valve**

Valve settings contains flow and temperature merged into two bytes, flow occupies 4 most significant bits and remaining 12 bits is used for the temperature

Flow [0-7]				Temperature [20°C – 45°C, 0.1°C step]											
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

Query Definitions

Current state – bath

Type: 0x71

Query:

- No data

Reply:

Bath, desired Temperature [0.1°C]	Bath, desired Water Level 0-	Bath, State [empty=0, emptying=1, pause=2, filling=3, filled=4]
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MSB	LSB	100 [%]	
0	1	2	3

Current state – shower

Type: 0x72

Query:

Shower Number [0-11]
0

Reply:

Shower Number [0-11]	Shower, desired Temperature [0.1°C]		Shower, state [on=0,off=1]	Shower, Water Desired Flow [1-7]
0	MSB 1	LSB 2	3	4

Shower, Current Temperature [0.1°C]		Shower, Water Current Flow [0-7]
MSB 5	LSB 6	7

Read Bath Preset values

Type: 0x73

Query:

Preset Number [1-9]
0

Reply:

Preset Number [1-9]	Bath, desired Temperature [0.1'C]		Bath, desired Water Level 0- 100 [%]
	MSB	LSB	
0	1	2	3

Dispenser 1 0-100	Dispenser 2 0-100	Dispenser 3 0-100	Dispenser 4 0-100	Dispenser 5 0-100	Dispenser 6 0-100
4	5	6	7	8	9

Dispenser 7 0-100	Dispenser 8 0-100	Dispenser 9 0-100	Dispenser 10 0-100	Dispenser 11 0-100	Dispenser 12 0-100
10	11	12	13	14	15

Preset Name	Time	
	MSB	LSB
16..n	n+1	n+2

Field Description:

- Preset Name

Preset name follows the preset settings without string termination character

Read Dispenser

Type: 0x75

Query:

Dispenser Number [1-12]
0

Reply:

Dispenser Number	Drops [0-100]	Dispenser Name
0	1	2..n

Field Description:

- Dispenser Name

Dispenser name follows the dispenser settings without string termination character

ShowerPreset

Type: 0x76

Query:

Preset Number [1-9]
0

Reply:

Preset Number [1-9]
0

Shower 1		Shower 2		Shower 3		Shower 4	
1	2	3	4	5	6	7	8

Shower 5		Shower 6		Shower 7		Shower 8	
9	10	11	12	13	14	15	16

Preset Name
17 .. 37

Field Description:

- **Shower**

Shower settings contains flow and temperature merged into two bytes, flow occupies 4 most significant bits and remaining 12 bits is used for the temperature

Flow [0-7]				Temperature [20°C – 45°C, 0.1°C step]											
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

Device states

After Reset

When first powered, reset or reconnected BOM2LAN needs to gather minimum information required to work. Current state of the system command Reply will have all Preset Update Request bits set. UUI need to update presets values as soon as possible.

Normal Operation

BOM2LAN operates based on locally kept data and if need request data to be set from in UUI as a result of a user interaction with the system what is reflected by a state of Preset change request and Current state update fields in a Reply of Current state of the system command.

iShower Extension to BOM2 Protocol

Commands

Set shower settings for a group (250)

Send a command to control group of shower valves:

Command:

BOM2_250_xxx!

Number of groups	
0	1

Shower Number		Temperature				Flow	State
2	3	4	5	6	7	8	9

Shower Number		Temperature				Flow	State
10	11	12	13	14	15	16	17

Note: all of the values are sent in DEC format but source, additionally temperature is sent with 0.1 resolution but with step 1.

Reply:

OK_250

Query

Get shower settings for a group (250)

Request shower groups state, sends information about all shower valves and groups assigned to them. In current iOS implementation shower valve id is ignored and the group id is used instead.

Query:

BOM_250?

Reply:

OK_250_

Number of valves in the frame (V)	
0	1

ID		Group		Settings	
2	3	4	5	6	7

Current Temp				Desired Temp			
8	9	10	11	12	13	14	15

Current Flow	Desired Flow	State
16	17	18

.
.

.

ID		Group		Settings	
17*V+2	3	4	5	6	7

Current Temp				Desired Temp			
8	9	10	11	12	13	14	15

Current Flow	Desired Flow	State
16	17	18

Currently only following parameters are used:

- ID
- Desired temp
- Desired flow
- State

Design Notes

Parameters

BATH CURRENT SETTINGS:

Desired Water Level: 0 - 100 [%]

Desired Water Temperature: 20 - 43 [°C]

Current Water Level: 0 - 100% normally, but is possible a value above 100% .

Current Water Temperature: - the current temperature is read from TOG_BOM, and may be outside the 20 - 43 [°C] range.

Dispensers: 12

Dispenser drops: 0 - 100

Dispenser name: 20 characters, but if the string is longer than 9 chars, it will be scrolled.

: Emptied, Emptying, Pause, Filling, Filled

SHOWER CURRENT SETTINGS:

Desired Temperature: 20 -45 [°C]

Desired Flow: 1-7

Current Temperature: Aqualisa does not return the current temperature value. It only indicates if the required temperature is reached or not.

Current Flow: As with the temperature, Aqualisa reports if the required flow is reached or not.

Number of Showers: up to 12 [FV]

BATH PRESET SETTINGS:

Number of presets: 9

Name String Length: 20 but if the string is longer than 10 chars, it will be scrolled.

Desired Water Level: 0 - 100 [%]

Desired Water Temperature: 20 - 43 [°C]

Dispenser: all dispensers in the system (12), values from 0 (inactive) to max allowed (100 drops)

And the time of preset execution will be added, maybe as read only option.

SHOWER PRESET SETTINGS:

(Not sure if we had any in BOMv1 and assuming we have some now)

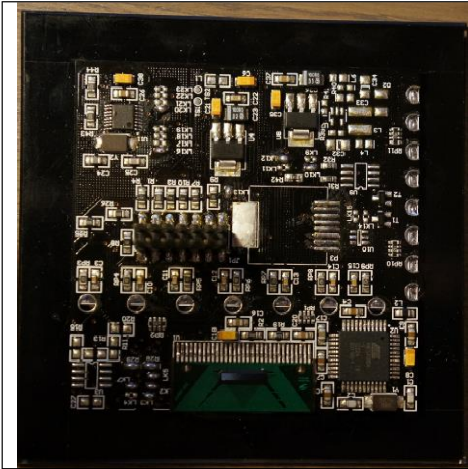
There are not shower presets in bathomatic UII_B for now.

Shower presets are in the iShower UII_S project.

Connectors

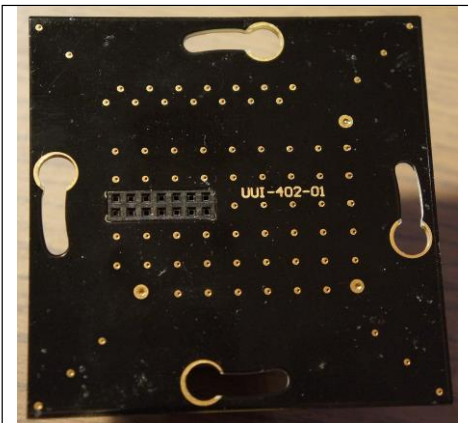
Connectors

TQ



ORST	SHT21_SCL	RST	OSI	OA0	RX_D	VCC
13	11	9	7	5	3	1
14	12	10	8	6	4	2
OCS	PDI	SHT21_SDA	GND	OSCL	TX_D	3V3

UUI



GND		SDA	GND	OSCL	RXQ_5V	3V3
14	12	10	8	6	4	2
13	11	9	7	5	3	1
OLED_RST	SCL	PORST	OSI	OA0	TXQ_5V	VCC