unique automation
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Project number: **BV001**

Project name: **Bathovision – Communications Protocol**

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Table of contents

Changes

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BV RS232 Protocol

Communication parameters

Parameter name	**Value**
Signal Level	RS232C compliant
Synchronization method	Asynchronous
Baud rate	9600
Parity	None
Character length	8 bits
Stop Bit	1
Flow Control	None

Frame structure

START	**P1**	**P2**	**P3**	**PARAMETER INDICATOR**	**PARAM1**	**…**	**PARAM*n***	**STOP**
1 byte	3 bytes			1 byte	n - bytes			1 byte
Constant value – *0x21(‘!’)*	3 bytes command indicator			Constant value *0x3A(‘:’)*	Parameters field			Constant value – *0x25(‘%’)*
				Those bytes are include in frame with parameters only				

Example of use:

1. Turn on TV

<*0x21*>PON<*0x25*>

2. Set program number to 125

<*0x21*>PRS<*0x3A*>125<*0x25*>

Command definitions

N#	Function	Command	Parameters	Description
Basic functions				
0	Power ON	PON		Panasonic
1	Power OFF	POF		Panasonic
2	VOL+	AUU		Panasonic
3	VOL-	AUD		Panasonic
4	PR+	PR+		
5	PR-	PR-		
6	Mute toggle	AMT		Panasonic
7	Program	PRS	000..999	*Extended* [1]
8	TV/AV	IMS		Panasonic
9	TEXT	TXT		
10	Bath Button			
11	SLEEP	SLP		
12	ARC	ARC		
13	SUBTITLE	STE		
14	INFO	IFO		
Menu functions				
15	Picture Menu	MNT		
16	Arrow Up	ARU		
17	Arrow Down	ARD		
18	Arrow Left	ARL		
19	Arrow Right	ARR		
20	OK	OKB		
21				
Additional Functions				
22	Red Btn	RED		
23	Green Btn	GRN		
24	Yellow Btn	YLW		
25	Blue Btn	BLE		
26	EPG	EPG		
27	DTV	DTV		
28	MIX	MIX		
29	SIZE	SZE		
30	INDEX	IEX		
31	UPDATE	UPD		
32	TIME	TME		
33	REVEAL	RVL		
34	HOLD	HLD		
35	PIP	PIP		

[1] It's possible to reduce number of digits if non-ascii character or ASCII character different then 0,1,2,3,4,5,6,7,8,9 will be sent, to set channel 5 string <*0x02*>PRS<*0x3A*>aa5<*0x03*>

36	PIP INPUT	PIN		
37	PIP SWAP	PSW		
38	PIP POSITION	PPS		
39	PIP MODE	PMD		
40	ASTERIX	ASX		
41	PIP PROGRAM UP	PP+		
42	PIP PROGRAM DOWN	PP-		
43	PICTURE	PCE		
44	SOUND	SND		
45	DTV AUDIO	DAO		
46	DTV PROFILE	DPL		

Additional command definitions

Button state (BTN)

Read state of buttons.

Command:
<0x21>**BTN** <0x25>

Response:
<0x21>**BTN**<0x3A>***SN$_1$N$_2$***<0x25>

Where:
S – 1 – button is being pressed
N$_1$N$_2$ – number of last pressed button (hexadecimal value 00..FF)

Current temperature (TMP)

Read state of current temperature in ‘C deg.

Command:
<0x21>**TMP** <0x25>

Response:
<0x21>**TMP**<0x3A>***T$_1$T$_2$***<0x25>

Where:
C$_1$C$_2$ – current temperature in ‘C (hexadecimal value 00..FF)

Read button settings (BTD)

Read state of one button:

Command:
<0x21>**BTD**<0x3A>***B₁B₂***<0x25>

Where:
B_1B_2 – button number

Response:
<0x21>**BTD**<0x3A>***B₁B₂ L₁L₂L₃L₄M₁M₂M₃M₄***<0x25>

Where:
B_1B_2 – button number
L_1L_2 L_3L_4 - level value (hexadecimal 0xL_1L_2 L_3L_4)
$M_1M_2M_3M_4$ – margin level (hexadecimal 0x$M_1M_2M_3M_4$)

Write calibration value (BTW)

Set delay time and margin size for all buttons

Command:
<0x21>**BTW**<0x3A>**BVC*T₁T₂ M₁M₂M₃M₄*** <0x25>

Where:
BVC - magic characters, uses to validation
T_1T_2 – validation time (after that pressed button is recognised as a proper event), value as hexadecimal value 0xT_1T_2
$M_1M_2M_3M_4$ – margin difference (hexadecimal 0x$M_1M_2M_3M_4$)

Response:
<0x21>**BTW**<0x3A>

Read calibration value (BTR)

Set delay time and margin size for all buttons

Command:
<0x21>**BTR** <0x25>

Response:
<0x21>**BTR**<0x3A>***T₁T₂ M₁M₂M₃M₄***<0x25>

Where:
T_1T_2 – validation time (after that pressed button is recognised as a proper event), hexadecimal value 0xT_1T_2
$M_1M_2M_3M_4$– margin difference in hexadecimal 0x$M_1M_2M_3M_4$

Read version information (VER)

Read information about version of connected devices:

Command:
<0x21>**VER**<0x3A>***D_1D_2*** <0x25>

Where:
D_1D_2 – device number (hexadecimal $0xD_1D_2$)

Response:
<0x21>**VER**<0x3A> ***D_1D_2 FV_1FV_2 HV_1HV_2***<0x25>

Where:
D_1D_2 – device number in hexadecimal $0xD_1D_2$
FV_1FV_2 – firmware version (hexadecimal $0xFV_1FV_2$)
HV_1HV_2 – hardware version (hexadecimal $0xHV_1HV_2$)

$0xFV_1FV_2$ and $0xHV_1HV_2$ have to by grater than 0x00 if not then device is not attached to the system

NOTE: Number of devices can be found in Attachment A.

Read critical temperature (CTR)

Read critical temperature, if the TV achieves the value it will be set into stand-by mode

Command:
<0x21>**CTR**<0x3A>

Response:
<0x21>**CTR**<0x3A> ***T_1T_2*** <0x25>

Where:
T_1T_2 – critical temperature in'C hexadecimal $0xT_1T_2$

Write critical temperature (CTW)

Set critical temperature

Command:
<0x21>**CTW**<0x3A>**BVC*T_1T_2*** <0x25>

Where:
BVC - magic characters, uses to validation

T_1T_2 – critical temperature (hexadecimal 0xT_1T_2)

Response:
<0x21>**BVC**<0x3A>

Read state of TV (TVS)

Read state of the TV

Command:
<0x21>**TVS**<0x25>

Response:
<0x21>**TVS**<0x3A> ***S_1S_2*** <0x25>

Where:
S_1S_2 – state of the TV (hexadecimal 0xS_1S_2)

0	0	0	0	0	0	ON	STAND-BY
Future use						TV ON	Stand-by mode

Possible states:

Value	State
0	Power OFF
1	Stand-by mode
2	TV ON

Attachment A: Device identification

ID	Description
1	Main Board (BV01)
2	Buttons (BV02)
3	I2C to RS232C Converter