



ZBS-120/121

Interface Control Document

History:

DVers.:	Date	Author	Change	State
1.00	02.12.2008	PI-LF	Born	
1.01	16.12.2008	PI-LF	TXT & MSI realized in [s] instead of [min]	
1.02	29.12.2008	PI-LF	Added PIR motion detection support	
1.03	09.01.2009	PI-TL	Minor description adjustments	
1.04a	24.04.2009	PI-LF	Added ID Extended time range for PIR quiescence time to 6500 s Added MSENS for sensitivity for PIR motion detection Added battery voltage Modified range of values for brightness Added LD0 (LED) Added HUM (humidity sensor) Added READ/WRITE commands direct XBee register access AT → API	
2.00	19.05.2009	PI-TL	FW Version 0200 New default values for HIBRI and MSENS Added SET LD1	
2.01	17.06.2009	PI-MH	FW Version 0202 Send event counter added Device acknowledges corrected Added BAT and UBAT to DEV telegram Added SET HIHUM Added SET LOHUM Added SET HBEAT	
2.02	06.08.2009	PI-MH	FW Version 0206 Added cause for DEV telegram	
2.03	11.12.2009	PI-MH	Motion Detection output changed	release
2.04	20.01.2011	PI-MH	Commands for pressure sensor added	

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2.05	09.06.2011	PI-MH	FW Version 0309 Commands and events for the detection of sensor changes added. Commands to read ZBS settings added. Measurement units to the GET answer added	
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Direction from Coordinator	Syntax	Parameter	Description	Example	
I	GET	./.	(no single parameter possible)	Get bulk sensor information telegram from ZBS module	see below
		BRI	Brightness in [lux] (0..2000)	BRI=321x	
		DBRI	In case of a forbidden changing of brightness, between two MSI intervals, show this the change.	DBRI=1231x	
		TEM	Temperature in [°C] with decimal point (0..50)	TEM=27.5°C	
		DTEM	In case of a forbidden changing of temperature, between two MSI intervals, show this the change.	DTEM=1.6°C	
		HUM	Humidity in [%] (optional)	HUM=65%	
		DHUM	In case of a forbidden changing of humidity, between two MSI intervals, show this the change.	DHUM=5%	
		PRES	Pressure in [hPa] with decimal point (300..1100) (optional)	PRES=1015.46hPa	
		DPRES	In case of a forbidden changing of pressure, between two MSI intervals, show this the change.	DPRES=12hPa	

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		BAT	Battery Status (only if battery is present e.g. ZBS-1xx) "LOW" if battery is low "OK" if battery is ok	BAT=OK
		UBAT	Battery Voltage in [V] with decimal point	UBAT=3.85V
I	DEV	./.	(no single parameter possible) Get bulk device information telegram from ZBS module	see below
		PID	Product Identification	PID=ZBS-121
		HW	Hardware Version	HW=0100
		SW	Software Version	SW=01000556
		SN	Serial Number, also used as node identifier in XBee module, max. 12 bytes	SN=00012345
		ID	ID for customer's purpose, max. 12 bytes	ID=0815BZ4711
		ST	Cause of DEV telegram 1 = DEV command 2 = Push button 4 = Device reset 8 = PAN connect 16 = Heartbeat <u>Note:</u> Concurrent causes are added to one value (e.g. Device reset and PAN connect → ST=12)	ST=16

		EV	TX telegram counter (repeatedly counts up to 65535 and restarts from 0)	EV=12
		BAT	Power supply status of the device	BAT=OK
		UBAT	Power supply voltage of the device	UBAT=3.76V
0	SET	TXT	TX Time in [s] (1..65000), default: 60	SET TXT=1800
0	SET	MSI	Measure Interval in [s] (1..65000), 0 means no measuring between TX intervals, default 0	SET MSI=120
0	SET	LOTEM	Minimum for Temperature Alert in [°C] (0.0..50.0), measures only if "MSI" is set, default 0.0 Must have a decimal point!	SET LOTEM=18.0
0	SET	HITEM	Maximum for Temperature Alert in [°C] (0.0..50.0), measures only if "MSI" is set, default 50.0 Must have a decimal point!	SET HITEM=22.0
0	SET	DTEM	Delta for Temperature Alert in [°C] (0.0..50.0), 0.0 means no delta control. Measures only if "MSI" is set, default 0.0 Must have a decimal point!	SET DTEM=1.2

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O	SET	LOBRI	Minimum for Brightness Alert in [lux] (0..2000), measures only if "MSI" is set, default 0	SET LOBRI=12
O	SET	HIBRI	Maximum for Brightness Alert in [lux] (0..2000), measures only if "MSI" is set, default 2000 Note: Sensor only works properly ..1000 lux	SET HIBRI=74
O	SET	DBRI	Delta for Brightness Alert in [lux] (0..2000), 0 means no delta control. Measures only if "MSI" is set, default 0 Note: Sensor only works properly ..1000 lux	SET DBRI=70
O	SET	LOHUM	Minimum for Humidity Alert in [%] (0..100), measures only if "MSI" is set, default 0	SET LOHUM=21
O	SET	HIHUM	Maximum for Humidity Alert in [%] (0..100), measures only if "MSI" is set, default 100	SET HIHUM=86
O	SET	DHUM	Delta for Humidity Alert in [%] (0..100), 0 means no delta control. Measures only if "MSI" is set, default 0	SET DHUM=5
O	SET	LOPRES	Minimum for Pressure Alert in [hPa] (300..1100), measures only if "MSI" is set, default 300	SET LOPRES=950
O	SET	HIPRES	Maximum for Pressure Alert in [hPa] (300..1100), measures only if "MSI" is set, default 1100	SET HIPRES=1050

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O	SET	DPRES	Delta for Pressure Alert in [hPa] (0..1100), 0 means no delta control. Measures only if "MSI" is set, default 0	SET DPRES=10
O	SET	MOVE	Quiescence Time in [s] (0..6500) Activates Motion Detection when Time is >= 1, device will not send any motion detection Messages for this period after the 1 st alarm message Default is 0 (deactivated)	SET MOVE=3600
O	SET	MSENS	Sensitivity for motion detection, default 5 (0..1000), lower means higher sensitivity, signal gets noisy below 5	SET MSENS=200
O	SET	HBEAT	Heartbeat Interval in [s] (1..65000), 0 means no heartbeat, default 0, sends DEV telegram	SET HBEAT=3600
O	SET	LD0	An action of the green LED triggers [repetitions, duration on * 100ms, duration off * 100ms]	SET LD0=10, 4, 1
O	SET	LD1	An action of the orange LED triggers [repetitions, duration on * 100ms, duration off * 100ms]	SET LD0=10, 4, 1
O	RESET	./.	Resets and associates device to the network	RESET
O	DEFAULTS	./.	Loads factory defaults	DEFAULTS

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I	./.	MOVE	Outgoing message in case of Motion Detection Alert. Behind the equal is the detection value reported.	MD=10
I	./.	Measurement Alert	If any alert situation comes out of threshold violation (temperature, brightness), the whole "bulk information telegram" is sent, see 1 st row in this table	BRI=371x DBRI=-121x TEM=8.2°C BAT=OK UBAT=4.25V
O	!#*	ID	Sets ID (default is the serial number)	!#*ID=1234567890
O	!#*	B1	Prepares for firmware update	!#*B1
O	!#*	B2	Erases flash and wait for updates	!#*B2
O	!#*	WRITE	Writes XBee register directly	!#*WRITE=SPG (writes '0x67' to 'sp' register)
O	!#*	READ	Reads XBee register directly	!#*READ=NP
I	./.	Register name and value	Separate message for READ result	NP='0x00''0x54'
O	!#*	REG1	Reads the first part of the ZBS settings	!#*REG1

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I	./.		Separate message for REG1 result	TXT=60 MSI=5 HBEAT=0 MOVE=10 MSENS=6 LOHUM=0 HIHUM=100 DHUM=8
O	!#*	REG2	Reads the second part of the ZBS settings	!#*REG2
I	./.		Separate message for REG2	LOTEM=0.0 HITEM=50.0 DTEM=0.5 LOPRES=300 HIPRES=1100 DPRES=0 LOBRI=0 HIBRI=2000 DBRI=100

Communication Facts & Features

- Communication Mode Xbee-Module: API
- All incoming messages must be terminated with linefeed character (0x0a)
- All outgoing messages are terminated with double linefeed character
- Maximum incoming message length: 24 bytes including linefeed
- Device acknowledges positive and negative:
 - SET TXT=480 ...will lead to... ack: set txt=480
 - SET TXR=480 ...will lead to... nack: set txr=480
- Alerts are getting transmitted immediately after measurement interval "MSI", no matter if TX interval time "TXT" is reached or not
- Motion detection messages are getting transmitted immediately

Firmware Update will affect

- Firmware
- SW-Version
- PID (product identification)

Firmware Update will NOT affect

- HW-Version
- ID
- SN