Sensor board broadcast frame

Revision	Date	history
rev. a	20/08/15	Starting revision
rev. b	01/03/2015	Added pressure (0xB.)

General description

Sensor board built for the Visible Things will broadcast the sensor information based on an internal (design choice) timer.

The broadcast fame is of type “ADV_NONCONN_IND”, (PDU type 0010) which has a limited payload of 28 bytes.

To make the payload flexible, the payload is built using “fields”, one field to identify a specific sensor type.

Field format

Each field is built by a sequence of bytes.

The first byte will identify the field type (4 MSB) and the field scale factor (4 LSB)

The following bytes (up to 3 bytes) will give the value for the field, the basic units of measurement will be multiplied by $2^{(scale\_factor - 8)}$ to get the effective value of the measurement, and will apply for all the following measurements.

This is the list of available field

Field name	Filed ID (MSB)	Parameter byte 1	Parameter byte 2	Parameter byte 2
reserved	“0000”			
Acceleration	“0001”	X-value, 2'complement value in units of 0.01g	Y-value, 2'complement value in units of 0.01g	Z-value, 2'complement value in units of 0.01g
Gyroscope	“0010”	X-value 2' complement value in units od 0.01deg/s	Y-value 2' complement value in units od 0.01deg/s	Z-value 2' complement value in units od 0.01deg/s
Magnetic field	“0011”	X-value 2' complement value in units of 10^{-6}T	Y-value 2' complement value in units of 10^{-6}T	Z-value 2' complement value in units of 10^{-6}T
Light	“0100”	Ambient light units ok klux	Infrare light units of mW/cm^2	UV light units of mW/cm^2
Temperature	“0101”	Ambient temperature unit of Celsius		
Noise	“0110”	Nouse level		

		units of dB (referred to the stadrad audio scale, 0dB = 20μPa)		
Battery voltage	“0111”	Battery voltage, units of 0,01V		
RF signal level from the sensor radio (RSSI)	“1000”	Signale level fro the radio, in units of dBm		
Cap. sens	“1001”	X-cap ccordinate 0-100% in units of 1%	Y-cap ccordinate 0-100% in units of 1%	
Humidity	“1010”	Humidity in %, scale 100%, unit 1%		
Pressure TDB	“1011” “1100”	Pressure is in mBar		
TDB	“1101”			
TDB	“1110”			
TDB	“1111”			

Payload format

Payload is simply a sequence of fields; **the application MUST scan the payload to find the fields and identify their values. The detailed content can change during the development of the Visible Things demo.**

The Freescale KL26Z Freedom board has FXOS8700CQ and an (un-calibrated) ambient light sensor, and a capacitive slide sensor

The payload build of 17 bytes

0x18, X-acc, Y-acc, Z-acc, 0x38, X-mag, Y-mag, Z-mag, 0x48, Ambient, 0x00, 0x00, 0x98, Slide, 0x00, 0x78, battery voltage.

The Silabs sensor demo has many different sensors, and almost fill up the payload (26 bytes)

0x18, X-acc, Y-acc, Z-acc, 0x38, X-mag, Y-mag, Z-mag, 0x28, X-rot, Y-rot, Z-rot, 0x48, Ambient, proximity, UV, 0xA8, Humidity (SI7021), 0x58, temperature (SI7021), 0x68, noise (ICS43432), 0x78, battery voltage, 0x88, RSSI

The Cypress sensor demo has many different sensors, with this payload (14 bytes)

0x18, X-acc, Y-acc, Z-acc, 0x48, Ambient, proximity, UV, 0xA8, Humidity (SI7021), 0x58, temperature (SI7021), 0xB8, pressure