

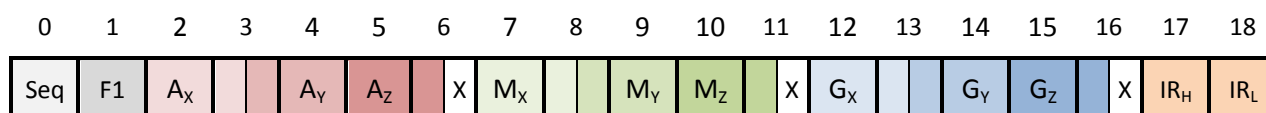
## BLUE BLUETOOTH LE INTERFACE

Version 2016 July 13<sup>th</sup> for SW versions

V140 and above

Blue protocol uses currently "Nordic UART Service" (NUS), having 128-bit UUID with value 0x9ECADC240EE5A9E093F3A3B50000406E (16-bit UID 0x0001).

After connecting to the device, the NUS-service starts immediately sending notifications containing the sensor data. Motion data is sent twenty times per second and ambient data once per second. Motion data packet has the following format, each bigger box representing a single byte (eight bits), and smaller box representing a half byte (four bits):



Where:

Seq is message sequence number

F1 (hex) is a fixed constant identifying the data content

A<sub>X</sub> is accelerometer X value, 12 bits

A<sub>Y</sub> is accelerometer Y value, 12 bits

A<sub>Z</sub> is accelerometer Z value, 12 bits

M<sub>X</sub> is magnetometer X value, 12 bits

M<sub>Y</sub> is magnetometer Y value, 12 bits

M<sub>Z</sub> is magnetometer Z value, 12bits

G<sub>X</sub> is gyroscope X value, 12 bits

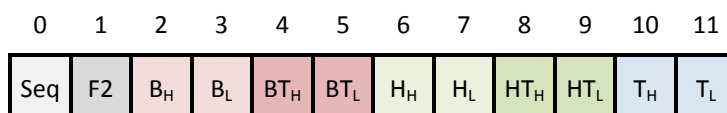
G<sub>Y</sub> is gyroscope Y value, 12 bits

G<sub>Z</sub> is gyroscope Z value, 12 bits

IR<sub>H</sub> and IR<sub>L</sub> are infrared sensor's temperature high and low bytes correspondingly

All "X"s are don't care half-bytes.

Ambient data has the following format:



Where:

$B_H$  and  $B_L$  are air pressure high and low bytes correspondingly

$BT_H$  and  $BT_L$  are air pressure sensor's temperature high and low bytes correspondingly

$H_H$  and  $H_L$  are air humidity's high and low bytes correspondingly

$HT_H$  and  $HT_L$  are air humidity sensor's temperature high and low bytes correspondingly

$T_H$  and  $T_L$  are temperature sensor's high and low bytes correspondingly

All X, Y and Z data are represented in signed 12-bit format (also called two's complement). The value range is thus from -2048 to 2047, but the corresponding "real-life" scale depends on the sensor. SI-units that can be computed from those raw values are  $m/s^2$  for the accelerometer, T (Tesla) or G (Gauss) for the magnetometer and rot/s (or deg/s) for the gyroscope. This conversion is not done by the device, but the values are just "raw" numbers.

Temperature data is represented also in signed 16-bit format, and the corresponding Celsius value can be computed by dividing the value with 256. Air humidity is also 16-bit value, but it is unsigned and the resulting value is then relative humidity in percent (RH%). Air pressure uses also 16-bit representation, but the value is unsigned and the value must be divided by 32 to get it converted into mbars.