

APPLICATION NOTE

WIRELESS RFID MOTION SENSOR

1 – Scope of the document:

The scope of this document is to define how work all our Wireless RFID motion sensors and to provide detailed information regarding their configuration through our ERW configuration software tool.

2 - Products :

Product	Reference
THINLINE_MOV	IPD0251
ITEMS_MOV	IDF0455
ITEMS_EMOV	IDF0951
THINLINE_MOV	IPD0251

Please note that the list of products above may not be exhaustive and only reflects the list of our existing Wireless RFID motion sensors at the date where this document's version has been released. However, all our Wireless RFID motion sensors have and will based upon the same principle.

3 – Data Frame format :

All our Wireless RFID motion sensors integrate a passive motion sensor.

During the tag's transmission, a Identifier transmission protocol coupled with the value of measured movement are used.

The transmitted frame's length is on 25 bits, divided in 12 bits for the identifier (ID) and 12 bits for movement value.

Example of MOV frame's format:

When the frame received by an Active RFID reader is [ADD016A701] :

- ⦿ AD is the level of « RSSI » or tag's emission power, coded on 8 bits
- ⦿ D01 is the tag's identifier (ID) coded on 12 bits
- ⦿ 6A7 is the value of measured movement, coded on 12 bits
- ⦿ 01 est the reader's identifier coded on 8 bits



To be noted : the movement is calculated on 16 bits. Generally the movements with normal amplitude have a value inferior to FFF (coding on 12 bits). However, in order to take into account the high amplitude movements, the movement value is calculated on 12 bits.

The value sent by the tag while emitting is a coded value limited to 12 bits. If the measured movement's value is inferior to 0FFE, the 3 lowest nibbles of the movement value are transmitted (from 000 to FFE). If the value is superior or equal to 0FFE, then the « FFE » value is transmitted.

Remark : the « FFF » value is reserved for the specific code « Low Battery Level ».



The radio protocol format to be selected in the ERW configuration is « 12 bits ID + 12 bits MVT »

4 – Programming if Movement Threshold and Transmission Cycle in the mode mode « no detected movement » :

2 parameters are used to defined the Transmission cycle in case of no movement and when movement is detected :

- ⦿ **The Transmission pre-divider**
- ⦿ **The movement threshold**

These parameters are programmed in the **Tag's User Memory**. The reading and programing fields are located at the bottom of the ERW's main page.

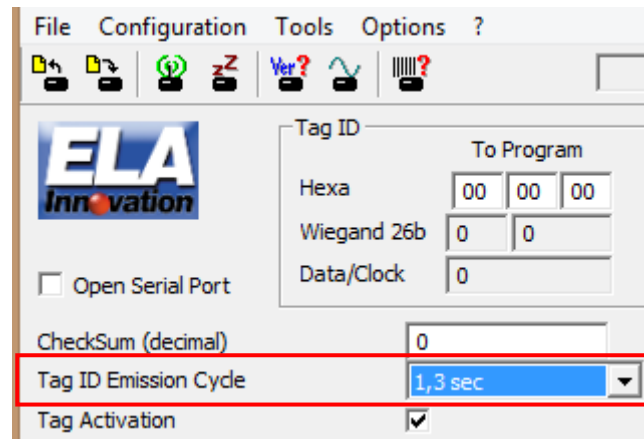
User Memory	
To Program	Read
02FFF	
<input type="button" value="Program"/>	<input type="button" value="Read"/>

Example : if the user memory is 0200FF :

- 🕒 **The Transmission pre-divider is 02**
- 🕒 **The Movement Threshold is 00FF**

4-1 Emission Mechanism:

When the measured movement exceeds the programmed threshold (superior or equal), the normal Tag ID Emission Cycle is applied. This is the value programmed in the ERW Configuration tool, as shown below.



When the measured movement is lower than the threshold, only one transmission over N (N being the programmed Pre-Divider) is made.

N is the Pre-Divider which can be programmed by the user in the User Memory Programming area, as shown above.

Example : if the standard emission cycle is **1,3s** (default value) and if the User Memory is **0200FF**, then the emission pre-divider in case of « no-movement » (meaning measured movements lower than the programmed threshold) is **02, or one transmission of ID frame every 2,6s only.**

4-2 Movement Threshold:

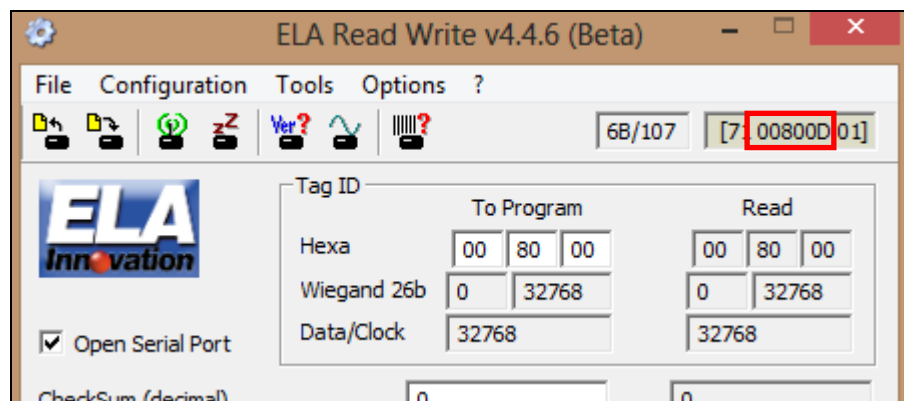
The threshold value can be programmed by the user. This value is coded on 2 bytes (16 bits) and is used to be compared to the value of measured movement, also coded on 16 bits.

- 👁️ **0000** is the lowest movement threshold, which corresponds to the highest movement sensitivity (detection of low amplitude movement).
- 👁️ **FFFE** is the highest movement threshold, which corresponds to the lowest movement sensitivit (detection of very high amplitude movement).

The methodology for configuring the movement threshold could be the following :

1. Program a low threshold (0001)
2. Program a Standard ID Tag Emission Cycle in order to collect easily multiple movement measurements while tuning (ex : 10 sec)
3. Perform to the tag a movement similar to the expected movement threshold (place or fix the tag in real situation)
4. Read the measured movement values, coded on 12 bits (3 latest ID characters)

You could take the movement values in the dynamic field, at the right top corner of the ERW mainpage.



At any movement, the value is immediatly updated, which is helpful to perform some attempts.

5. Program the read value as the movement threshold, by adding « 0 » for the highest nibble (coded on 16 bits). Please refer to chapter 3.

Example :

- 👁️ Read level: 4FD
- 👁️ Threshold to be programmed: 04FD