APPLICATION NOTE

WIRELESS RFID TEMPERATURE SENSOR
MINI DATALOGGER FEATURE

1 – Scope of the document

The scope of this document is to describe how use the Mini Datalogger feature implemented on our wireless RFID temperature sensor, the COIN T and to provide detailled information regarding the configuration through our ERW configuration software tool.

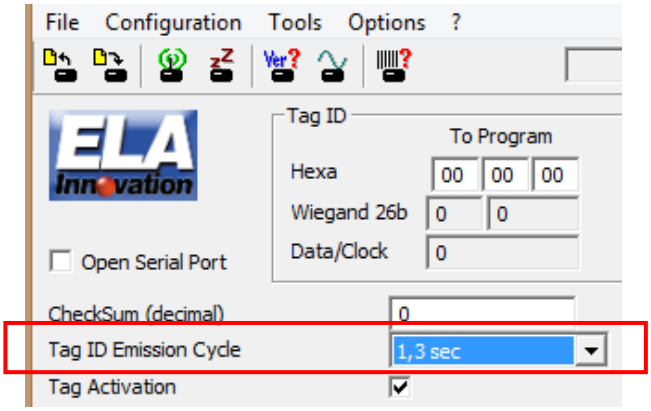
2 - Product

Product	Reference
COIN T MiniLog	IDF1073

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

3 – Operating mode

Firstly, our COIN T with the Mini datalogger feature works like a standard temperature sensor : at each wake-up phase, it transmits its real-time ambiant temperature.



Secondly, this specific sensor is able to record up to 16 temperature values. This parameter is adjustable by the user through the 2 first characters of the sensor's user memory. **These 2 ASCII characters are named NN**.

Please note that this internal temperature memory is based upon the FIFO (First In First Out) mechanism: the last recorded temperature value deletes the oldest one.

Thirdly, in addition of its normal behaviour, the sensor makes 2 specific operations at **an user-defined cycle, called PP**.

This PP cycle is adjustable by the user through the 2 last characters of the sensor's user memory, with a value from 00 to FF. This PP cycle acts as a pre-divider of the sensor's transmission cycle.

The 2 operations mentioned above done at this customized cycle (PP x Tag ID Emission cycle) are:

1. **Measure and record the temperature**

2. **Transmit its real-time temperature and then, successively, all the NN last recorded temperature values**

Example:

If NN is programmed at 16 (10hexa) and PP is programmed at 03 (hex), then the sensor will send the following frames:

T0: real-time temperature transmission.

T0 + 1 sensor's transmission cycle: real-time temperature transmission.

T0 + 2 sensor's transmission cycle : real-time temperature, temperature measured at T0, temperature measured at T0 - 3 periods, …, temperature measured at T0 – (16x3 periods).

T0 + 3 sensor's transmission cycle: real-time temperature transmission.

T0 + 4 sensor's transmission cycle: real-time temperature transmission.

T0 + 5 sensor's transmission cycle: real-time temperature, temperature measured at T0 + 3 periods, temperature measured at T0, …, temperature measured at T0 – (15x3 periods).

4 – Data Frame format

Our wireless temperature sensor COIN T with the Mini Datalogger feature **uses a 32-bit based data frame format**, instead of the 24-bit frame format used for the standard sensors.

The radio protocol format to be selected in the ERW configuration is «16b ID + 16b T°C LOG».

Please refer to our specifications MCHD available on the DOWNLOAD area in our website www.rfid-ela.eu to get detailled specifications, especially on the temperature calculation method.

See below an example of the frame format transmitted by our reader having received frames from our COIN T with Mini datalogger feature.

When the frame received by an Active RFID reader is [788001047801]:

- 78 is the level of « RSSI » or tag's emission power, coded on 2 ASCII characters over 1 byte
- 8001 is the tag's identifier (ID) coded on 4 ASCII characters over 2 bytes
- 0 is the position in the NN recorded temperature, coded on 1 ASCII character over 4 bits.
    - ✓ 0 is the real time temperature
    - ✓ 1 is the recorded temperature at T – (1 x PP cycle)
    - ✓ 2 is the recorded temperature at T – (2 x PP cycle)
    - ✓ etc
- 478 is the value of measured temperature, coded on 3 ASCII characters over 12 bits
- 01 est the reader's identifier coded on 1 ASCII character and 1 byte.

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

5 – How to program the sensor's user memory in our ERW software

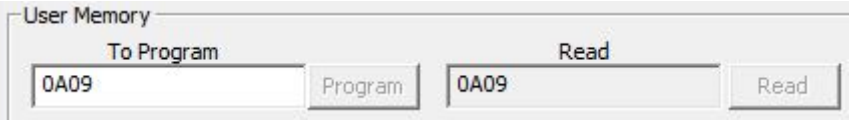
Please download our ERW configuration software for tags and sensors, available at our DOWNLOAD area on our website www.rfid-ela.eu

The radio protocol format to be selected in the ERW configuration is «16b ID + 16b T°C LOG».

Then, 2 parameters are used to define the mini-datalogger inside the COIN T's user memory:

- **The number of recorded temperature value or NN parameter, coded on 2 ASCII characters. The range is from 00 to 10 (up to 16 records).**
- **The sensor's transmission pre-divider or PP parameter, coded in 2 ASCII characters. The range is from 00 to FF.**

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



Example: in this case, the user memory is programmed with the frame 0A09 :

- The number of recorded temperatures is 10 (0A in hexa)
- The Transmission pre-divider is 09(hex), meaning that every 9 sensor's transmission cycle, the last 10 recorded temperature will be also transmitted.

You can find hereunder a screenshot of our ERW configuration software with, on the right side, the different settings and, on the left side, the received frames.

- The sensor ID is 8888(hex)
- The reader ID is 01(hex)

- The transmission cycle is programmed at 1,1 second.
- The number of recorded temperature is 10 (0Ahex).
- The recorded temperatures will be recorded every 9 period, meaning every 9,9 seconds.

That means that through this configuration, the user will have the possibility to recover the temperature monitoring during the last 90 seconds in case of a lost connection between the sensor and the reader.