

RELEASE NOTES FOR TEMP APP FW 2.0.0

CONCERNED PRODUCTS

The following products already contain this FW version:

- ARF8180BA**Z**: TEMP V3 LoRaWAN EU863-870
- ARF8181BA**Z**: TEMP V3 Sigfox RC1
- ARF8180BA**H**: TEMP V3 LoRaWAN EU863-870
- ARF8181BA**H**: TEMP V3 Sigfox RC1
- ARF8180BA2**H**: TEMP V3 TWO EXTERNAL PROBES LoRaWAN EU863-870
- ARF8181BA2**H**: TEMP V3 TWO EXTERNAL PROBES Sigfox RC1

SUMMARY

This version adds some important features:

- To optimize consumed bandwidth and to send only useful data, payload contains only the active sensors measures. Therefore, the 0x43 frame does not exist in this new version.
- Highly configurable historization mode
- Add a redundancy mechanism to optimize service continuity
- Alarms have now a dedicated framecode (0x58)
- Optional alarm repetition

You will find in this document the difference between the TEMP V1/V2 and the TEMP V3 and some instructions to help you to configure your product. The registers and the frames mentioned are all explained in the Technical Reference Manual of the concerned product (available online).

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CHANGES COMPARED WITH FW APP VERSION 1.3.9 (8180BAE, 8181BAD, 8180BA2E, 8181BA2D)

Registers

- S300 has evolved in its content and accepted values
- S301 has evolved in its content and accepted values
- S307 determines now the SFX BIDIR period
- S308 determines the LED activity
- Old S320 and S323 has been removed
- S330 to S334 now configure Sensor 1 alarms
- S340 to S344 now configure Sensor 2 alarms
- S320, S321 has evolved and determine now historization and sampling periods
- S322 now configure an optional alarm repetition period
- S323 now determines the number of redundant measures
- S340 move into S324

You can find all the related information in the *Technical Reference Manual* of the concerned product.

Uplinks

- Starting frames
 - Product configuration frames (0x10) have a payload which is slightly different as some registers are now 16bits (S321) and now contains additional registers S323 (redundancy)
 - Frames 0x11 and 0x12 does not exist anymore. This aims to limit the number of starting frames which are not relevant.
- Periodic frame
 - 0x43 frames are no longer sent and are now replaced by frame 0x57.
 - 0x57 has a different payload if one or both sensors are activated (status byte 'bit 4' indicates this configuration)
 - S323 allows to add redundant measures to always use the entire payload available and to increase service continuity.
 - If payload is too long for frame capacity (depending on the network), a flag will be set in status byte (bit 3 now used for this information).
- Alarm frame
 - Alarms have now a dedicated framecode 0x58)
 - Its content depends on the number of active sensors
- Keep alive frame
 - Its payload is slightly different (no more sensor IDs)
 - Its content depends on the number of active sensors

Downlinks

- Set register downlink (0x41) now generates an automatic status uplink 0x33 which determines if the request has been successfully handled or rejected. If rejected, it gives the reason and some details.

CONFIGURE YOUR PRODUCT AND DECODE IT

Test mode

To perform a test using the new version of the TEMP, please use the following instructions:

- Reduce transmission period
 - Choose a period for S321 (reading period x2 seconds)
 - Choose 1 for S320 to save the information at each sampling
 - Choose 1 for S301 to send a frame at each saving

Selecting 1 for S301 and choosing a period below 10 minutes result in violation of the Duty Cycle so you must deactivate it during your test.

- Deactivate the Duty Cycle
 - LoRaWAN: S220= 0x01
 - Sigfox: S317=0

When the test is complete, please reactivate the Duty Cycle since the liability is transferred to the user in case of violation of the regulations in force.

- Activate the Duty Cycle
 - LoRaWAN: S220= 0x05
 - Sigfox: S317=1

It is also recommended to change the reading period (S321) or the frequency of historization (S320) or frequency of the transmission (S301) to increase autonomy of the product.

Reminder: the more you send frame per day, the more you consume.

Periodical frame without historization

To use the TEMP without historization like it was propose in the previous software, use the following instructions:

- Set up the sampling period of the data
 - S321 = 1800 (1800 x 2seconds = 3600 seconds = 1hour)
- Set up the historization period
 - S320 = 1 (= at each reading so each hour) → at each reading the data is memorized, in this example every hour.
- Set up the transmission period
 - S301 = 1 (= at each saving the data is sent, so each hour) → it will send the frame every time the data is memorized, in this example every hour.

S301 at 1 means that the product sends only one data per frame and so that there is no historization.

Periodical frame with historization and without alarm

To use the TEMP with an historization, use the following instructions:

- Set up the sampling period
 - o $S321 = 300$ ($300 \times 2\text{seconds} = 600 \text{ seconds} = 10 \text{ minutes}$)
- Set up the historization period
 - o $S320 = 1$ (= at each reading so every 10 minutes) → at each reading the data is memorized, in this example every 10 minutes.
- Set up the transmission period
 - o LoRaWAN: $S301 = 6$ ($6 \times 10 \text{ minutes} = 1 \text{ hour}$) → with this example you memorize the data every 10 minutes and send the frame every hour.
 - o Sigfox: $S301 = 3$ ($3 \times 10 \text{ minutes} = 30 \text{ minutes}$) → 3 being the maximum of samples that a Sigfox frame can contain, it means that your product will memorize the data every 10 minutes and send the frame every 30 minutes.

ADVISE: When you do not need to send alarms, select the right period to measure temperature and fill 1 for S320 in the historization it will increase autonomy of the product.

REMINDER: in LoRaWAN the maximum sample per frame is 24 and in Sigfox it is 5. If you fill S301 with a value higher than the maximum tolerated by the network, a flag appeared in the status byte of the frame and the product will send the most recent samples in the frame (oldest will be lost). Be careful, if you activated the both sensors, the payload will be used for both sensor and so the number of samples should be adapted ($24/2 = 12$ samples in LoRaWAN and $5/2 = 2,5$, so 2 samples in Sigfox).

Periodical frame with historization and redundancy

To use the TEMP with historization and redundancy to increase either the autonomy of the product and the robustness of the data transmission, use the following instructions:

- Set up the sampling period
 - o $S321 = 1800$ ($1800 \times 2\text{seconds} = 3600 \text{ seconds} = 1 \text{ hour}$)
- Set up the historization period
 - o $S320 = 1$ (= at each reading so every hour) → at each reading the data is memorized, in this example every hour.
- Set up the transmission period
 - o LoRaWAN: $S301 = 4$ ($4 \times 1 \text{ hour} = 4 \text{ hours}$) → the frame will be sent every 4 hours (6 times a day)
 - o Sigfox: $S301 = 1$ (1 hour) → the frame will be sent every 1 hour
- Set up the redundancy with 1 sensor activated
 - o LoRaWAN: $S323 = 18$ ($24 - 4 = 18$) → if you want to use the maximum capacity of the frame to repeat samples, the formula is 24 (maximum samples in the LoRaWAN frame if only 1 sensor is activated) – S301 and it gives you the value to fill in S323. In this example the product will memorize the data every hour, send the frame every 4 hours with 24 samples (so 4 new samples and 18 memorized).
 - o Sigfox: $S323 = 4$ ($5 - 1 = 4$) → if you want to use the maximum capacity of the frame to repeat samples, the formula is 5 (maximum samples in the Sigfox frame if only one sensor is activated) – S301 and it gives you the value to fill in S323. In this example the product will memorize the data every hour, send the frame every hour with 5 samples (so 1 new sample and 4 memorized).
- Set up the redundancy with 2 sensors activated
 - o LoRaWAN: $S323 = 8$ ($12 - 4 = 8$) → if you want to use the maximum capacity of the frame to repeat samples, the formula is 12 (maximum samples in the LoRaWAN frame if 2 sensors are activated) –

S301 and it gives you the value to fill in S323. In this example the product will memorize the data every hour, send the frame every 4 hours with 12 samples for each sensor (so 4 new samples and 8 memorized).

- Sigfox: $S323 = 1 (2 - 1 = 1) \rightarrow$ if you want to use the maximum capacity of the frame to repeat samples, the formula is 2 (maximum samples in the Sigfox frame if only one sensor is activated) – S301 and it gives you the value to fill in S323. In this example the product will memorize the data every hour, send the frame every hour with 2 samples (so 1 new sample and 1 memorized).

REMINDER: in LoRaWAN the maximum sample per frame is 24 and in Sigfox it is 5. If you fill S301 with a value higher than the maximum tolerated by the network, a flag appeared in the status byte of the frame and the product will send the most recent samples in the frame (oldest will be lost). Be careful, if you activated the both sensors, the payload will be used for both sensor and so the number of samples should be adapted ($24/2 = 12$ samples in LoRaWAN and $5/2 = 2,5$, so 2 samples in Sigfox).

Periodical frame with historization and with alarm

To use the TEMP with an historization and with alarms, use the following instructions:

- Set up the sampling period
 - $S321 = 60 (60 \times 2 \text{seconds} = 120 \text{seconds} = 2 \text{minutes})$
- Set up the historization period
 - $S320 = 15 (= \text{each } 15 \text{ readings so every } 30 \text{ minutes}) \rightarrow$ each 15 readings the data is memorized, in this example every 30 minutes.
- Set up the transmission period
 - LoRaWAN: $S301 = 8 (8 \times 30 \text{ minutes} = 4 \text{ hours}) \rightarrow$ with this example the product memorizes the data every 30 minutes and send the frame every 4 hours.
 - Sigfox: $S301 = 4 (4 \times 30 \text{ minutes} = 2 \text{ hours}) \rightarrow$ with this example the product memorizes the data every 30 minutes and send the frame every 2 hours.
- Set up the alarm on sensor 1
 - $S330 = 1$ (low threshold) \rightarrow the product will send a frame if a low threshold is detected
 - $S333 = 180 (18^\circ\text{C}) \rightarrow$ the product will send a frame if temperature is under 18°C
 - $S334 = 20 (2^\circ\text{C}) \rightarrow$ the product will clear the alarm if the temperature is higher than 20°C
- Set up the alarm on sensor 2
 - $S330 = 0$ (deactivated) \rightarrow no alarm on the sensor 2

With this example the product will be able to detect a temperature under 18°C within 2 minutes.

The sampling period determines the latency of the product to send an alarm when a threshold is overpassed. Depending on your application, it can be important to be informed quickly in case of alarm but on the other hand not important to memorize the information so regularly.

REMINDER: in LoRaWAN the maximum sample per frame is 24 and in Sigfox it is 5. If you fill S301 with a value higher than the maximum tolerated by the network, a flag appeared in the status byte of the frame and the product will send the most recent samples in the frame (oldest will be lost). Be careful, if you activated the both sensors, the payload will be used for both sensor and so the number of samples should be adapted ($24/2 = 12$ samples in LoRaWAN and $5/2 = 2,5$, so 2 samples in Sigfox).

Alarm repetition

To use the function that enables the product to repeat the alarm if still activated after a period, use the following instructions:

- Set up the sampling period
 - o $S321 = 60$ ($60 \times 2\text{seconds} = 120 \text{ seconds} = 2 \text{ minutes}$)
- Set up the alarm on sensor 1
 - o $S330 = 1$ (low threshold) → the product will send a frame if a low threshold is detected
 - o $S333 = 180$ (18°C) → the product will send a frame if temperature is under 18°C
 - o $S334 = 20$ (2°C) → the product will clear the alarm if the temperature is higher than 20°C
- Set up the alarm on sensor 2
 - o $S330 = 0$ (deactivated) → no alarm on the sensor 2
- Set up the alarm repetition period
 - o $S322 = 2$ ($\times S321$) → in this example the product will repeat the alarm every 4 minutes if the threshold is still overpassed.

With this function the product repeats the alarm at an interval determined by $S322 \times S321$. It enables the user to be informed that the alarm is still activated and monitor the temperature during this time.

