MCF88 DATA FRAME FORMAT

Revision History:

Author	Release	Note
S.Colognato	1.0 29/09/2016	First release
P. Bagnara	1.1 30/09/2016	
P. Bagnara	1.2 05/06/2017	– added option type in time sync and removed threshold option – added off message – added set period message – added report data message – power message modified
P. Bagnara	1.3 31/08/2017	– added generic sensor – added battery percentage to tprh and kamstrup messages
P. Bagnara	1.4 27/10/2017	– Added encryption
P. Bagnara	1.5 11/01/2018	– Added lux/voc
P. Bagnara	1.6 06/02/2018	– Added pressure compensation
P. Bagnara	1.7 21/03/2018	– Added analog input, ultrasound, modbus, davis
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P. Bagnara	1.9 11/04/2018	– Minor updates
P. Bagnara	1.10 01/06/2018	– Minor updates
P. Bagnara	1.11 18/06/2018	– CO2
P. Bagnara	1.12 26/07/2018	– PM2
P. Bagnara	1.13 02/08/2018	– Device code list
P. Bagnara	1.14 07/09/2018	– Added Davis data description
P. Bagnara	1.15 23/10/2018	– Fixed CO2 uplink id
P. Bagnara	1.16 16/11/2018	– Links added
P. Bagnara	1.17 29/11/2018	– Minor updates
P. Bagnara	1.18 22/02/2019	– PM
P. Bagnara	1.19 27/02/2019	– Added special data
P. Bagnara	1.20 06/03/2019	– Added pulse output mode

The document describes encryptions related to LoRaWAN™ payloads. Relevant chapters per product of interest are marked with a cross “X”.

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MCF-LW06485	X					X					X			X			X
MCF-LW06VMC	X										X			X			X
MCF-LW06232	X		X								X	X		X			X
MCF-LW06420	X							X			X			X			X
MCF-LW06010	X							X			X			X			X
MCF-LW06424	X							X			X			X			X
MCF-LW06420D	X							X			X			X			X
MCF-LW06010D	X							X			X			X			X
MCF-LW06424D	X							X			X			X			X
MCF-LW06KIO	X				X					X	X		X				X
MCF-LW12PLG	X			X	X						X		X	X	X		X
MCF-LW12MET	X			X	X						X		X	X	X		X
MCF-LW13IO	X				X						X		X				X
MCF-LW13MIO	X				X						X		X				X
MCF-LW12TERWP	X	X									X			X		X	X
MCF-LW12TERPM	X					X					X			X		X	X
MCF-LW12TER	X	X									X			X		X	X
MCF-LW12VOC	X						X				X			X		X	X
MCF-LW12CO2	X								X		X			X		X	X
MCF-LWWS00	X					X					X			X			X
MCF-LWWS01	X					X					X			X			X
MCF-LW06DAVK	X					X					X			X			X
MCF-LW06DAVKP	X					X					X			X			X

1. UPLINK MESSAGES FROM END-DEVICES

HOME

1.1 TIME SYNC REQUEST

HOME

name	size [byte]	hex value	mean
Uplink ID	1 byte	01	Time sync request
Sync ID	4 byte	XX XX XX XX	ID of sync request
Sync Version	3 byte (optional)	XX XX XX	Major and minor version and build
Application type	2 byte	02 00	for MCF-LW06VMC
		02 01	for MCF-LW06232
		02 02	for MCF-LW06KAM
		02 03	for MCF-LW06485
		02 04	for MCF-LWWS00 and MCF-LW06DAVK
		02 05	for MCF-LW06KIO
		02 06	for MCF-LW12WAM
		02 07	for MCF-LW06420/010 OBSOLETE
		02 08	for MCF-LWWS01 and MCF-LW06DAVKP
		02 09	for MCF-LW06420
		02 0A	for MCF-LW06010
		02 0B	for MCF-LW06424
		02 0C	for MCF-LW06420D
		02 0D	for MCF-LW06010D
		02 0E	for MCF-LW06424D
		04 00	for MCF-LW12TER
		04 01	for MCF-LW12TERWP
		04 02	for MCF-LW12VOC
		04 03	for MCF-LW12CO2
		04 05	for MCF-LW12TERPM
		07 00	for MCF-LW12MET
		07 01	for MCF-LW13IO
		07 02	for MCF-LW12PLG
		09 00	for MCF-LW13MIO
RFU	X byte	XX..	Optional RFU byte

The device, after sending the message, waits for the time sync answer (2.1 TIME SYNC ANSWER).If nothing received, it will try to send the request a couple of times. If error persists, it will try again after a few hours.

If it receives the right answer, it aligns the internal clock and a new sync message will be sent after a week to overcome real time clock drift.

1.2 TEMPERATURE/PRESSURE/HUMIDITY

HOME

name	size [byte]	hex value	mean
Uplink ID	1 byte	04	Temperature/Pressure/Humidity
Data	10 byte	XX XX …..	Measure 1, refer to Note1
	10 byte	XX XX …..	Measure 2, refer to Note1
	10 byte	XX XX …..	Measure 3, refer to Note1
Batt %	1 byte (optional)	XX	Battery percentage
RFU	4 byte (optional)	XX XX XX XX	Optional RFU byte

Note1:

The 10 bytes for each measurement are divided as follows:

- 4 bytes are for the date and time. The MSB (most significant byte) is on the right so they must be read from the right. The 4 byte in reverse order are as follows:
  - 7 bit for the offset of the year, starting from the year 2000
  - 4 bit per month
  - 5 bit for day of the month
  - 5 bits for hour
  - 6 bits for minutes
  - 5 bits for half the seconds. The seconds range is from 0 to 31, so the result should be multiplied by 2 to find the actual seconds of the measurement.
- 2 bytes for temperature. The temperature is represented by a signed integer with the least significant byte first. The temperature is expressed in hundreds of a °C degree.
- 1 byte for humidity. Relative humidity is an unsigned integer corresponding to twice the percentage of humidity.
- 3 bytes for pressure. Pressure is an unsigned integer with the least significant byte first; it is expressed in Pascal.

Example

Sample payload:
04dc7e3721b40a47608801dd7e3721b10a43608801e07e3721b20a425d8801
Remove the first byte and divide the other 30 into 3 parts by 10 byte that correspond to 3 measurements.
The 3 measurements will be:

- *dc7e3721b40a47608801*
- *dd7e3721b10a43608801*
- *e07e3721b20a425d8801*

Decipher the first measurement dividing it by groups and applying the necessary transformations:

- *Measurement date: dc 7e 37 21*
  - *Byte swapping, result: 21 37 7e dc*
  - *The result in bits will be: 00100001 00110111 01111110 11011100*
    - *The bits are divided as explained above*
      - *Year: 0010000*
        - *Result: 16*
          - *2000+16 = 2016*
      - *Month: 1001*
        - *Result: 9*
      - *Day: 10111*
        - *Result: 23*
      - *Hour: 01111*
        - *Result: 15*
      - *Minutes: 110110*
        - *Result: 54*
      - *Seconds: 11100*
        - *Result: 28*
          - *28*2 = 56*
  - *The date of the measurament will be: 23/09/2016 15:54:56.*
- *Temperature: b40a*
  - *Byte swapping, result: 0ab4*
    - *The result (with sign) will be +2740 with two decimal places, then + 27.40 °C.*
- *Humidity: 47*
  - *In decimal is 71, the humidity is 71/2 = 35.5% rH.*
- *Pressure: 608801*
  - *Byte swapping, result: 018860*
    - *In decimal, the result is 100448, with two decimal places the pressure is 1004.48 hPa.*

1.3 UART

HOME

name	size [byte]	hex value	mean
Uplink ID	1 byte	05	uart
Data	Application related	XX XX..	Data to be forwarded, message sent via serial or usb command.

1.4 POWER

HOME

The recurrent message of metering end-nodes is as follows:

name	size [byte]	hex value	mean
Uplink ID	1 byte	09	Power
Date/Time	4 byte	XX XX XX XX	Date and time (as for Note1)
Active energy	4 byte (s32 LSB)	XX XX XX XX	Cumulative active energy (Wh)
Reactive energy	4 byte (s32 LSB)	XX XX XX XX	Cumulative reactive energy (VARh)
Apparent energy	4 byte (s32 LSB)	XX XX XX XX	Cumulative apparent energy (VAh)
Running Time	4 byte (u32 LSB)	XX XX XX XX	Seconds of running (s)

After a message of metering request (2.5 METERING REQUEST) the uplink is as follows:

name	size [byte]	hex value	mean
Uplink ID	1 byte	09	Power
Date/Time	4 byte	XX XX XX XX	Date and time (as for Note1)
Active energy	4 byte (s32 LSB)	XX XX XX XX	Cumulative active energy (Wh)
Reactive energy	4 byte (s32 LSB)	XX XX XX XX	Cumulative reactive energy (VARh)
Apparent energy	4 byte (s32 LSB)	XX XX XX XX	Cumulative apparent energy (VAh)
Active power	2 byte (s16 LSB)	XX XX	Active power (W)
Reactive power	2 byte (s16 LSB)	XX XX	Reactive power (VAR)
Apparent power	2 byte (s16 LSB)	XX XX	Apparent power (VA)
Voltage	2 byte (u16 LSB)	XX XX	Voltage (dV RMS)
Current	2 byte (u16 LSB)	XX XX	Current (mA RMS)
Period	2 byte (u16 LSB)	XX XX	Period (us)
Running Time	4 byte (u32 LSB)	XX XX XX XX	Seconds of running (s)

1.5 IO

HOME

name	size [byte]	hex value	mean
Uplink ID	1 byte	0A	Input/output
Date/Time	4 byte	XX XX XX XX	Date and time (as for Note1)
Inputs	4 byte (u32 LSB)	XX XX XX XX	Bit mask of the inputs
Outputs	4 byte (u32 LSB)	XX XX XX XX	Bit mask of the outputs
Events	4 byte (u32 LSB)	XX XX XX XX	Bit mask of input events

This uplink format is for 32 inputs and 32 outputs. Relevant bits depend on the device part number and its I/O capability.

In case of MCF-LW12PLG, the input status represents the status of the mains (1 for mains present, 0 for mains not present).

1.6 REPORT DATA

HOME

name	size [byte]	hex value	mean
Uplink ID	1 byte	0B	Report data
Report ID	1 byte	0Y	for MCF-LW06KAM, "Y" is the sequential number of the transmission in progress, is incremented at the end of each transmission.
		1Y	for MCF-LW06485, "Y" is the sequential number of the transmission in progress, is incremented at the end of each transmission.
		2Y	for MCF-LWWS00, MCF-LWWS01, MCF-LW06DAVK and MCF-LW06DAVKP, "Y" is the sequential number of the transmission in progress, is incremented at the end of each transmission.
		3Y	for MCF-LW12TERPM, "Y" is the sequential number of the transmission in progress, is incremented at the end of each transmission.
Frame ID	1 byte	XX	Progressive frame index, increased at each transmission with the same identifier
Data	1..32 byte	XX XX…	for MCF-LW06485 refer to Note2 for MCF-LWWS00 refer to Note3 for MCF-LW06DAVK refer to Note3 for MCF-LWWS01 refer to Note4 for MCF-LW06DAVKP refer to Note4 for MCF-LW12TERPM refer to Note9

Note2:

The modbus frame consists of at least 3 bytes.

In case of error, it will return 0200XX where XX indicates the type of error.

In case of success, the first two bytes (us16 LSB) indicate the length (including the two bytes) and the remaining bytes is the data read from the peripheral Modbus device(s).

Note3:

The Davis weather station frame is made up of at least 4 bytes.

In the event of an error it returns XXYYZZZZ , where XX indicates the data version, YY the type of error, ZZZZ the size of the read data.

If case of successful reading of weather data, the data sequence will be as in the following table, data with more than 1 bytes is LSB:

name	size [byte]	mean
Data version	1 byte	Current version is 0
Davis type	1 byte	16 (0x10) for Vantage Pro/Pro2
Barometer data	2 byte (u16 LSB)	Unit is mHg (Hg/1000)
Outside temperature	2 byte	Unit is d°F (°F/10)
Wind speed	1 byte	Unit is mph (miles per hour)
Avg wind speed	1 byte	Unit is mph
Wind direction	2 byte	Value from 1 to 360 degrees. (0° is no wind data, 90° is East, 180° is South, 270° is West and 360° is north)
Outside humidity	1 byte	Relative humidity in %
Rain rate	2 byte	Number of rain clicks (0.2mm or 0.01in). inches/hour
UV	1 byte	Unit is in UV index
Solar radiation	2 byte	The unit is in watt/meter2
Day rain	2 byte	Number of rain clicks (0.2mm or 0.01in)
Day et	2 byte	Unit is inch / 1000
Soil moisture	4 byte	Unit is in centibar. It supports four soil sensors.
Leaf wetness	4 byte	Number from 0 to 15 with 0 meaning very dry and 15 meaning very wet. It supports four leaf sensors.
Forecast icons	1 byte	Single Bit meaning is: 0x01 = Rain 0x02 = Cloud 0x04 = Partly cloudly 0x08 = Sun 0x10 = Snow Mixed forecasts are possible. See examples below.
Bar trend	1 byte	Signed byte that indicates the current 3-hour barometer trend. It is one of these values: -60 = Falling Rapidly = 196 (as an unsigned byte) -20 = Falling Slowly = 236 (as an unsigned byte) 0 = Steady 20 = Rising Slowly 60 = Rising Rapidly 80 = ASCII "P" = no trend info is available Any other value means that the Vantage does not have the 3 hours of bar data needed to determine the bar trend.
RFU	3 byte	Optional RFU bytes. Only present in MCF-LWWS01 and MCF-LW06DAVKP

Examples of Forecast icons:

decimal	hex	Segments shown	Forecast
8	0x08	Sun	Mostly Clear
6	0x06	Partial Sun + Cloud	Partly Cloudy
2	0x02	Cloud	Mostly Cloudy
3	0x03	Cloud + Rain	Mostly Cloudy, Rain within 12 hours
18	0x12	Cloud + Snow	Mostly Cloudy, Snow within 12 hours
19	0x13	Cloud + Rain + Snow	Mostly Cloudy, Rain or Snow within 12 hours
7	0x07	Partial Sun + Cloud + Rain	Partly Cloudy, Rain within 12 hours
22	0x16	Partial Sun + Cloud + Snow	Partly Cloudy, Snow within 12 hours
23	0x17	Partial Sun + Cloud + Rain + Snow	Partly Cloudy, Rain or Snow within 12 hours

Note4:

Refer first to Note3. In addition are PM readings are on a separate uplink. The field “Data”, in case of success, is as follow:

- 4 bytes are for the date and time (as per Note1)
- 6 bytes are for PM measures: 2 bytes for each measurement, formatted as LSB, reporting in order pm1.0, pm2.5 and pm10 in µg/m3

Note9:

The 16 bytes of Data are divided as follows:

- 4 bytes are for the date and time. The MSB (most significant byte) is on the right so they must be read from the right. The 4 byte in reverse order are as follows:
  - 7 bit for the offset of the year, starting from the year 2000
  - 4 bit per month
  - 5 bit for day of the month
  - 5 bits for hour
  - 6 bits for minutes
  - 5 bits for half the seconds. The seconds range is from 0 to 31, so the result should be multiplied by 2 to find the actual seconds of the measurement.
- 2 bytes for temperature. The temperature is represented by a signed integer with the least significant byte first. The temperature is expressed in hundreds of a °C degree.
- 1 byte for humidity. Relative humidity is an unsigned integer corresponding to twice the percentage of humidity.
- 3 bytes for pressure. Pressure is an unsigned integer with the least significant byte first; it is expressed in Pascal.
- 6 bytes are for PM measures: 2 bytes for each measurement, formatted as LSB, reporting in order pm1.0, pm2.5 and pm10 in µg/m3.

Example

Sample payload:
0b3a006caf51266409338b8701170022002a00

Uplink ID: 0b
Report ID: 3a
Frame ID: 00
Data: 6caf5126 6409 33 8b8701 1700 2200 2a00

- *date and time are: 6c af 51 26*
  - *Byte swapping, result: 26 51 af 6c*
  - *The result in bits will be: 00100110 01010001 10101111 01101100*
    - *The bits are divided as explained above*
      - *Year: 0010011*
        - *Result: 19*
          - *2000+19 = 2019*
      - *Month: 0010*
        - *Result: 2*
      - *Day: 10001*
        - *Result: 17*
      - *Hour: 10101*
        - *Result: 21*
      - *Minutes: 111011*
        - *Result: 59*
      - *Seconds: 01100*
        - *Result: 12*
          - *12*2 = 24*
  - *The date of the measurament will be: 17/02/2019 21:59:24.*
- *Temperature: 6409*
  - *Byte swapping, result: 0964*
    - *The result (with sign) will be +2404 with two decimal places, then +24.04 °C.*
- *Humidity: 33*
  - *In decimal is 51, the humidity is 51/2 = 25.5% rH.*
- *Pressure: 8b8701*
  - *Byte swapping, result: 01878b*
    - *In decimal, the result is 100235, with two decimal places the pressure is 1002.35 hPa.*
- *PM1: 1700*
  - *Byte swapping, result: 0017*
    - *In decimal, the result is 23, the PM1 value is 23 µg/m3.*
- *PM2.5: 2200*
  - *Byte swapping, result: 0022*
    - *In decimal, the result is 34, the PM1 value is 34 µg/m3.*
- *PM10: 2a00*
  - *Byte swapping, result: 002a*
    - *In decimal, the result is 42, the PM1 value is 42 µg/m3.*

1.7 TEMPERATURE/PRESSURE/HUMIDITY/LUX/VOC HOME

name	size [byte]	hex value	mean
Uplink ID	1 byte	0C	Temperature/Pressure/Humidity/Lux/Voc
Data	14 byte	XX XX …..	Measure 1, refer to Note5
	14 byte	XX XX …..	Measure 2, refer to Note5
Batt %	1 byte (optional)	XX	Battery percentage
RFU	6 byte (optional)	XX XX XX XX	Optional RFU byte

Note5:

The first 10 bytes for each measurement are the same as defined in Note1, the following 4 bytes are as follows:

- 2 bytes for illuminance. Luminance is represented by an unsigned integer with the least significant byte first. The Luminance is reported in lux (lx).
- 2 bytes for VOC (Volatile organic compounds). The VOC level is reported according to setup of the device made with LoRaTool APP, as unsigned with the least significant byte first:
  - index (IAQ - indoor air quality) between 0 (clean air) and 500 (heavily polluted air)
  - bVOC value between 500ppb (clean air) and 50000ppb (heavily polluted air)

1.8 ANALOG DATA

HOME

name	size [byte]	hex value	mean
Uplink ID	1 byte	0D	Analog data
Type	1 byte	00	for MCF-LW12WAM
		01	for MCF-LW06420 and MCF-LW06420D
		01	for MCF-LW06010 and MCF-LW06010D
		01	for MCF-LW06424 and MCF-LW06424D
Data	1..34 byte	XX XX XX…	Refer to Note6

Note6:

Data are as follow:

- 4 bytes are for the date and time (as per Note1)
- 8 byte for measurements, 2 byte for each measurement, formatted as LSB with the following meaning:
  - Bit 0..11: measured value, to be rescaled according to the type
  - Bit 12: equal to 1 if error: if the measured value is 0 means sensor disconnected (4-20mA only); greater or equal to 0xF00 it is a generic measurement error
  - Bit 13..14: measure type:
    - 0: 4-20 mA
    - 1: 0-10 V
    - 2: 0-5 V
  - Bit 15: RFU

1.9 T/P/RH/LUX/VOC/CO2

HOME

name	size [byte]	hex value	mean
Uplink ID	1 byte	0E	T/P/rH/Voc/Lux/Co2
Data	16 byte	XX XX …..	Measure 1, refer to Note7
	16 byte	XX XX …..	Measure 2, refer to Note7
Batt %	1 byte (optional)	XX	Battery percentage
RFU	2 byte (optional)	XX XX	Optional RFU byte

Note7

Data are as follow:

- The first 14 bytes for each measurement are the same as defined in Note5
- Following 2 bytes are for CO2. CO2 concentration is represented by an signed integer with the least significant byte first. The CO2 is expressed in ppm.

1.10 SPECIAL DATA

HOME

name	size [byte]	hex value	mean
Uplink ID	1 byte	0F	Special data
Type	1 byte	00	Card Data message
Data	1..32 byte	XX XX…	for Card Data message refer to Note10

Note10:

Data are as follow:

- 4 bytes for the date and time (as per Note1)
- 1 byte for communication status:
  - Bit 0 (mask 0x01): equal to 1 is communication with the reader is OK
  - Bit 4 (mask 0x04): equal to 1 if card present

If card present, data frame also contains:

- 1 byte card identifier: equal to 0x01 for ISO14443 type
- 1 byte for UID legth
- 1 byte for SAK number
- n byte for UID

Example

Sample payload:
0f006caf512611010408447b8043

Uplink ID: 0f
Type: 00
Date and time: 6caf5126
- *The date of the measurement will be: 17/02/2019 21:59:24.*

Communication status: 11
- *bit 0 = 1 (communication OK), bit 4 = 1 (card present)*

Card identifier: 01
UID Length: 04
SAK byte: 08
UID: 447b8043

2. UPLINK MESSAGES FROM END-DEVICES

HOME

2.1 TIME SYNC ANSWER

HOME

name	size [byte]	hex value	mean
Downlink ID	1 byte	00	Time sync answer
Sync ID	4 byte	XX XX XX XX	Copy of received Sync ID
Date/time	4 byte	XX XX XX XX	Date/time GMT, refer to Note8

Note8:

Date/time GMT in DOS format with epoch 2000. Sent as LSB. In bits, will be:

- 7 bits for year, starting from the year 2000
- 4 bits for year
- 5 bits for day in the month
- 5 bits for hour
- 6 bits for minutes
- 5 bits for half of seconds

Example

For date 23/09/2016 15:54:56:

- *Year 2016 = bit 0010000*
- *Month 9 = bit 1001*
- *Day 23 = bit 10111*
- *Hour 15 = bit 01111*
- *Minutes 54 = bit 110110*
- *Seconds 56 (/ 2 = 28) = bit 11100*

The sequence in bits is "00100001001101110111111011011100", corresponding to the hexadecimal "21377edc", which will be sent as LSB: dc 7e 37 21

2.2 UART

HOME

name	size [byte]	hex value	mean
Downlink ID	1 byte	03	Uart
Data	Application related	XX XX….	Data to be forwarded, proprietary protocol.

2.3 IO MESSAGE

HOME

name	size [byte]	hex value	mean
Downlink ID	1 byte	04	General message
Option	1 byte	00	Identify an IO message
Enable	4 byte (u32 LSB)	XX XX XX XX	Bit mask of the outputs to be enabled
Disable	4 byte (u32 LSB)	XX XX XX XX	Bit mask of the outputs to be disabled
Ton	16 byte (Optional)	XX ……XX	2 bytes (LSB) per output (outputs 1 to 8): if ≠ 0, set the activation time (base 100ms) of output[n]

If both the enable and the disable bit are equal to zero, the current status will be sent

2.4 SET PERIOD

HOME

name	size [byte]	hex value	mean
Downlink ID	1 byte	04	General message
Option	1 byte	01	Identify a SET PERIOD message
Option 2	1 byte	XX	Set device operation period in minutes (note that some devices have a minimum period, eg MCF-LW12TER 10 min, MCF-LW12VOC 15 min, MCF-LW12TERPM 15 min)

2.5 METERING REQUEST

HOME

name	size [byte]	hex value	mean
Downlink ID	1 byte	04	General message
Option	1 byte	02	Identify a METERING REQUEST message. Requires special message metering
Option 2	1 byte	00	

2.6 SET PRESSURE COMPENSATION

HOME

name	size [byte]	hex value	mean
Downlink ID	1 byte	04	General message
Option	1 byte	03	Identify a SET PRESSURE COMPENSATION message
Offset	2 byte	XX XX	Add an offset to the pressure in Pa (LSB) (int with sign) to compensate for the altitude, see following table

meters	*Pa*	*meters*	*Pa*
-305	-3700	1646	18300
-244	-3000	1707	18900
-183	-2200	1768	19500
-122	-1500	1829	20100
-61	-700	1890	20700
0	0	1951	21300
		2012	21900
61	700	2073	22500
122	1500	2134	23100
183	2200	2195	23700
244	2900	2256	24300
305	3600	2316	24900
366	4300	2377	25500
427	5000	2438	26100
488	5700	2499	26600
549	6400	2560	27200
610	7100	2621	27800
671	7800	2682	28300
732	8500	2743	28900
792	9200	2804	29500
853	9800	2865	30000
914	10500	2926	30600
975	11200	2987	31100
1036	11800	3048	31600
1097	12500	2926	30600
1158	13200	2987	31100
1219	13800	3048	31600
1280	14500		
1341	15100		
1402	15700		
1463	16400		
1524	17000		
1585	17600		

2.7 OFF COMMAND

HOME

name	size [byte]	hex value	mean
Downlink ID	1 byte	04	General message
Option	1 byte	FF	Identify an OFF message
Option 2	1	00	If it is a battery-powered device, turn off the module, otherwise it will restart it.