DELTA P

Technical Reference Manual

868 EU - LoRaWAN / Sigfox

Applicable for APP versions >= 2.0.0

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NEW DOCUMENTATION / NOUVELLE DOCUMENTATION

	ENGLISH	FRANCAIS
USER GUIDE	• Dedicated to a product • Cautions & electrical warnings • Declaration of conformity • Product functionalities and modes • Casing dimensions • Characteristics (casing and electrical) • LED explanations • Specific wiring on terminal blocks	• Dédié à un produit • Recommandations et avertissements électriques • Déclaration de conformité • Fonctionnalités et modes du produit • Dimensions du boitier • Caractéristiques (boitier et électrique) • Explication des LED • Câblage sur bornier spécifique au produit
TECHNICAL REFERENCE MANUAL	• Dedicated to a product • Registers content • Frame explanations (uplink and downlink)	• Dédié à un produit • Contenu des registres • Explication des trames (uplink et downlink)
INSTALLATION GUIDE	• For all adeunis® products • Configuration of the products • Installation and fixing • Start-up of the products • Opening and closing the case • Replace battery	• Pour tous les produits adeunis® • Configuration des produits • Installation et fixation • Démarrage des produits • Ouvrir et fermer les boîtiers • Remplacer la batterie

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1 REGISTERS

1.1 Generic registers

Register	Size (bytes)	Base	Description	Default Value	Range (Min-Max)	Comments
304	2	10	PIN code	0 (deactivated)	0 - 9999	PIN code used with ATPIN command. Value 0 disables the PIN code.
306	1	10	Product mode	0	0: PARK 1: RUN	In PARK mode, product is not using Radio. In RUN mode, product will send/receive RF uplinks/downlinks.

1.2 Applicative registers

Register	Size (bytes)	Base	Description	Default value	Min-Max Value	Comments
300	2	10	Keep alive period	8640 (24h)	2 ... 65535	X 10 seconds
301	2	10	Transmit period of data for Delta Pressure	1	0 ... 65535	Number of backups (history logs) to be done before sending a frame (thus defining the sending period). The value 0 is equivalent to disabling the periodic mode.
308	4	16	LED activity	0x10007F	0 … 0xFFFFFFFF	Default: 10007F Other values : reserved
320	2	10	History period for Delta Pressure	1	1 ... 65535	Number of readings to be performed before saving in the history logs The value 1 is equivalent to 1 backup per reading
321	2	10	Sampling period for Delta Pressure	1800 (1h)	0 ... 65535	X 2 seconds 0 : no sampling (deactivation of the DELTA P function)
322	2	10	History period for Analog channel	0	1 ... 65535	Number of readings to be performed before saving in the history logs The value 1 is equivalent to 1 backup per reading
323	2	10	Sampling period for Analog channel	0 (OFF)	0 … 65535	X 2 seconds 0 : no sampling (deactivation of the Analog function)
324	2	10	Transmit period of data for Analog measures	0	0 ... 65535	Number of backups (history logs) to be done before sending a frame (thus defining the sending period). The value 0 is equivalent to disabling the periodic mode.

1.3 Alarm registers

1.3.1 DELTA P alarm

Register	Size (bytes)	Base	Description	Default value	Min-Max value	Comments
330	1	10	Alarm type for Delta Pressure	0 (inactive)	0: Inactive 1: Low threshold 2: High threshold 3: Both thresholds	
331	2	10	High threshold value (Delta P)	0	-500…500	Value in Pa
332	2	10	High threshold hysteresis (Delta P)	0	0…500	Value in Pa
333	2	10	Low threshold value (Delta P)	0	-500…500	Value in Pa
334	2	10	Low threshold hysteresis (Delta P)	0	0…500	Value in Pa

1.3.2 Analog (0-10V)

Register	Size (bytes)	Base	Description	Default value	Min-Max value	Comments
350	1	10	Alarm type (0-10V)	0 (inactive)	0: Inactive 1: Low threshold 2: High threshold 3: Both thresholds	
351	2	10	High threshold value (0-10V)	0	0…10000	Value in mV
352	2	10	High threshold hysteresis (0-10V)	0	0…5000	Value in mV
353	2	10	Low threshold value (0-10V)	0	0…10000	Value in mV
354	2	10	Low threshold hysteresis (0-10V)	0	0…5000	Value in mV

1.3.3 Digitals inputs/outputs

Register	Size (bytes)	Base	Description	Default value	Min-Max value		Comments
380	1	16	Digital Input/Output 1 Configuration	0x00	<7:4> Debounce duration 0: no debounce 1: 10 ms 2: 20 ms 3: 50 ms 4: 100 ms 5: 200 ms 6: 500 ms 7: 1 s 8: 2 s 9: 5 s A: 10 s	B: 20 s C: 40 s D: 60 s E: 5 minutes F: 10 minutes <3:0> Type 0 = Deactivated 1 = Event ON 2 = Event OFF 3 = Event ON/OFF 4 = Output	

381	2	10	Digital Input/Output 1 threshold	1	1 – 65535		Number of detections before to send the frame alarm
382	1	16	Digital input/output2 Configuration	0x00	<7:4> Debounce duration 0: no debounce 1: 10 ms 2: 20 ms 3: 50 ms 4: 100 ms 5: 200 ms 6: 500 ms 7: 1 s 8: 2 s 9: 5 s A: 10 s	B: 20 s C: 40 s D: 60 s E: 5 minutes F: 10 minutes <3:0> Type 0 = Deactivated 1 = Event ON 2 = Event OFF 3 = Event ON/OFF 4=Output ON	
383	2	10	Digital input/output 2 threshold	1	1 – 65535		Number of detections before to send the frame alarm
390	4	10	Digital input 1 global counter	0	0 – 2^{32}-1		In-RAM counters that stores all the detected events on the channel This register is not saved in EEPROM. Its value is therefore set to 0 if the product is not powered anymore
391	4	10	Digital input 2 global counter	0	0 – 2^{32}-1		
392	1	10	Digital input 1 output state	0 (OFF)	0 (OFF / OPEN) – 1 (ON / CLOSED)		If channel is configured as an output, this register determines its state. This register is not saved in EEPROM. Its value is therefore set to 0 if the product is not powered anymore
393	1	10	Digital input 2 output state	0 (OFF)	0 (OFF / OPEN) – 1 (ON / CLOSED)		

1.4 Radio registers

1.4.1 LoRaWAN Network Registers

Register	Description	Encoding	Details
201	Spreading Factor (SF) by default (Read Only)	Decimal	Default: 12 Min/max: 4 to 12 Unit: None
204	Reserved	Hexadecimal	Do not use
214	LORA APP-EUI (first part – MSB)	Hexadecimal	Default: 0 Key encoded on 16 characters. Each register contains a part of the key. Used during the JOIN phase in OTAA mode E.g.: APP-EUI = 0018B244 41524632 • S214 = 0018B244 • S215 = 41524632
215	LORA APP-EUI (second part – MSB)	Hexadecimal	

216	LORA APP-KEY (first part – MSB)	Hexadecimal	Default: 0 Key encoded on 32-byte characters. Each of the 4 registers contains 8 characters. Used during the JOIN phase in OTAA mode E.g.: APP-KEY = 0018B244 41524632 0018B200 00000912 • S216 = 0018B244 • S217= 41524632 • S218=0018B200 • S219= 00000912
217	LORA APP-KEY (second part – MID MSB)	Hexadecimal	
218	LORA APP-KEY (third part – MID LSB)	Hexadecimal	
219	LORA APP-KEY (fourth part – LSB)	Hexadecimal	
220	LoRaWAN Options	Hexadecimal	Default: 5 Bit 0: Activation of the ADR ON(1)/OFF(0) Bit 1: Reserved Bit 2: DUTYCYCLE ON(1)/DUTYCYCLE OFF(0) Bits 3 & 4: Reserved Bits 5 to 7: Reserved CAUTION: Deactivation of the Duty Cycle may result in a violation of the conditions of use of the frequency band, depending on the use of the device, thus violating the regulations in force. In the case of disabling the Duty Cycle, liability is transferred to the user.
221	Mode of activation	Decimal	Default: 1 Choice: (see NOTE 1 after the table) • 0: ABP • 1: OTAA
222	LORA NWK_SKEY (first part – MSB)	Hexadecimal	Default: 0 Parameter encoded on 16 bytes. Each of the 4 registers contains 4 bytes.
223	LORA NWK_SKEY (second part - MID MSB)	Hexadecimal	
224	LORA NWK_SKEY (third part - MID LSB)	Hexadecimal	
225	LORA NWK_SKEY (fourth part – LSB)	Hexadecimal	
226	LORA APP_SKEY (first part – MSB)	Hexadecimal	Default: 0 Parameter encoded on 16 bytes. Each of the 4 registers contains 4 bytes.
227	LORA APP_SKEY (second part - MID MSB)	Hexadecimal	
228	LORA APP_SKEY (third part - MID LSB)	Hexadecimal	
229	LORA APP_SKEY (fourth part – LSB)	Hexadecimal	
280	NETWORK ID	Hexadecimal	Default: 0 Read only
281	DEVICE ADDRESS	Hexadecimal	Default: 0

NOTE 1: The “Over The Air Activation” (OTAA) mode uses a JOIN phase before being able to transmit on the network. This mode uses the APP_ EUI (S214 and S215) and APP_KEY (S216 to S219) codes during this phase to create the keys for network communication. Once this phase is completed, the codes APP_sKEY, NWK_sKEY and DEVICE ADDRESS will be present in the corresponding registers. A new JOIN phase is started every time the device exits Command mode, a reset is performed or the device is turned on.
Codes:
• APP_EUI identifier for global use (provided by default by adeunis®)
• APP_KEY device application key (provided by default by adeunis®)

The “Activation by personalization” (ABP) mode has no JOIN phase; it transmits directly on the network using the codes NWK_sKEY (S222 to S225), APP_sKEY (S226 to S229) and DEVICE ADDRESS (S281) to communicate.
Codes:
• NWK_sKEY network session key (provided by default by adeunis®)
• APP_KEY applicative session key (provided by default by adeunis®)
• DEVICE ADDRESS Address of the device in the network (provided by default by adeunis®)

Register	Size (bytes)	Base	Description	Default Value	Range (Min-Max)	Minimum required Application version	Comments
303	1	10	LoRaWAN Confirmed mode	0	0-1	V1.2.0	LoRaWAN only – activation or deactivation of the confirmed mode 0: deactivation 1: activation

1.4.2 Sigfox Network Registers

Register	Size (bytes)	Base	Description	Default Value	Range (Min-Max)	Minimum required Application version	Comments
307	2	10	Sigfox Downlink period	1440 (24h)	0-65535	>= V2.0.0	X 1 minute ⇨ Period: 1 min to 45 days
317	1	10	Sigfox DutyCycle	1	0-1	V1.2.0	0: dutycycle activated 1: dutycycle deactivated Not displayed anymore in LoRaWAN since 2.0.0

2 RADIO PROTOCOL

Data with size greater than 1 byte will be transmitted MSB first.
In LoRaWAN, frames are sent on port 1.

2.1 Status byte

All frames sent by the product contain a status byte. Its format is identical for all IoT Adeunis products.

Alarm Status	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
	Frame Counter			AppFlag2	AppFlag1	Reserved	Low Bat	Config
No Error	0x00 to 0x07			0	0	0	0	0
Configuration done				0	0	0	0	1
Low bat				0	0	0	1	0
Reserved				0	0	1	0	0
AppFlag1				0	1	0	0	0
AppFlag2				1	0	0	0	0

The status byte provides two bits reserved for a specific use of each product (AppFlag1 and AppFlag2).
For this product:

- AppFlag1: configuration inconsistency
  - Samples lost in periodic data frame because the payload is not sufficient.
- AppFlag2: not used

2.2 Uplink Frame format

2.2.1 DELTA P configuration (0x10)

This frame is sent following the reception of a frame with code 0x01, or at the start of the product.

Offset (in byte)	Data	Description
0	0x10	Frame code
1	Status	Status byte
2-3	S300	Transmission period of the Keep Alive frame
4-5	S301	Transmission period of the periodic frame (Delta P)
6-7	S320	History period (Delta P)
8-9	S321	Sampling period (Delta P)

Decoding example:

Offset (in byte)	Data	Description
0	0x10	Frame code
1	0x00	Frame counter: 0 No error
2-3	0x21C0	8640 => 8640 x 10s = 86400s = 24h
4-5	0x0001	1
6-7	0x0001	1
8-9	0x0708	1800 => 1800 x 2s = 3600s = 1h

2.2.2 Analog (0-10V) configuration (0x11)

If the Analog feature (0-10V) is active, a frame 0x11 is sent at the start of the product.

Offset (in byte)	Data	Description
0	0x11	Frame code
1	Status	Status byte
2-3	S322	History period (0-10V)
4-5	S323	Sampling period (0-10V)
6-7	S324	Transmission period (0-10V)

Decoding example:

Offset (in byte)	Data	Description
0	0x11	Frame code
1	0x00	Frame counter: 0 No error
2-3	0x0001	1
4-5	0x0708	1800 => 1800 x 2s = 3600s = 1h
6-7	0x0001	1

2.2.3 Digital inputs/outputs configuration (0x1F)

If one of the digital inputs/outputs is active, the frame 0x1F is sent at the start of the product.

Offset (in byte)	Data	Description
0	0x1F	Frame code
1	Status	Status byte
2	S380	Configuration Digital input/output 1
3-4	S381	Threshold of the Digital input 1
5	S382	Configuration Digital input/output 2
6-7	S383	Threshold of the Digital input 2

Decoding example:

Offset (in byte)	Data	Description
0	0x1F	Frame code
1	0x00	Frame counter: 0 No error
2	0x41	Event ON, debounce of 100 ms
3-4	0x0001	1 event before sending the frame
5	0x00	Digital input 2 disabled
6-7	0x0001	1 event before sending the frame

2.2.4 Network configuration (0x20)

This frame is sent following the reception of a frame with code 0x02, or at the start of the product.

2.2.4.1 LoRaWAN 868

Offset (in byte)	Data	Description
0	0x20	Frame code
1	Status	Status byte
2	S220	LoRaWAN options Bit 0: Activation of the ADR ON(1)/OFF(0) Bit 1: Reserved Bit 2: DUTYCYCLE ON(1)/DUTYCYCLE OFF(0) Bits 3 & 4: Reserved Bit 5: CLASS A (0) Bits 6 to 7: Reserved
3	S221	Provisioning mode (0: ABP, 1:OTAA)

Decoding example:

Offset (in byte)	Data	Description
0	0x20	Frame code
1	0x00	Frame counter: 0 No error
2	0x05	CLASS A Duty cycle activated ADR ON
3	0x01	OTAA

2.2.4.2 Sigfox 868

Offset (in byte)	Data	Description
0	0x20	Frame code
1	Status	Status byte
2	S202	Retry count

Decoding example:

Offset (in byte)	Data	Description
0	0x20	Frame code
1	0x00	Frame counter: 0 No error
2	0x02	2 retries

2.2.5 Keep alive frame (0x30)

This frame is sent after an amount of time determined by S300 register or if the magnet is detected in PRODUCTION mode.

Offset (in byte)	Data	Description
0	0x30	Frame code
1	Status	Status byte
2-3	Delta P	Signed value in Pa
4-5	0-10V	Not signed value in mV
6	Digital inputs	Bit 0: State of the digital input 1 Bit 1: State of the digital input 2

Decoding example:

Offset (in byte)	Data	Description
0	0x30	Frame code
1	0xE0	Frame counter: 7 No error
2-3	0x012C	300 Pa
4-5	0x251C	9 500 mV
6	0x01	Digital input 1 @1 so ON (closed) Digital input 2 @0 so OFF (Opened)

2.2.6 Periodic data frames (0x53, 0x55)

2.2.6.1 Delta P (0x53)

The historization period for DELTA P is defined by: S321 * S320
The sending frequency for DELTA P is defined by: S321 * S320 * S301

Maximum number of samples per frame:

- LoRaWAN 868: 24 samples
- Sigfox 868: 5 samples

Offset (in byte)	Data	Description
0	0x53	Frame code
1	Status	Status byte
2-3	Delta P t=0	Measure at t=0
4-5	Delta P t=-1	Measure at t=-1
6-7	Delta P t=-2	Measure at t=-2
8-9	Delta P t=-3	Measure at t=-3
10-11	Delta P t=-4	Measure at t=-4
…	…	

Decoding example (for 2 samples):

Offset (in byte)	Data	Description
0	0x53	Frame code
1	0x80	Frame counter: 4 and No error
2-3	0x0140	320 Pa
4-5	0x0190	400 Pa

2.2.6.2 Analog (0-10V) (0x55)

The historization period for 0-10V is defined by: S322* S323
The sending frequency for 0-10V is defined by: S322 * S323 * S324

Maximum number of samples per frame and per channel:

- LoRaWAN 868: 24 samples
- Sigfox 868: 5 samples

Offset (in byte)	Data	Description
0	0x55	Frame code
1	Status	Status byte
2-3	0-10V t=0	Measure at t=0
4-5	0-10V t=-1	Measure at t=-1
6-7	0-10V t=-2	Measure at t=-2
8-9	0-10V t=-3	Measure at t=-3
10-11	0-10V t=-4	Measure at t=-4
…	…	

Decoding example (for 2 samples):

Offset (in byte)	Data	Description
0	0x55	Frame code
1	0x20	Frame counter: 1 No error
2-3	0x2580	9 600 mV
4-5	0x2710	10 000 mV

2.2.7 Alarms (0x51, 0x52, 0x54, 0x56)

2.2.7.1 Delta P (0x54)

This frame is sent during the appearance, or disappearance, of a threshold exceeding alarm for the Delta Pressure.

Offset (in byte)	Data	Description
0	0x54	Frame code
1	Status	Status byte
2	Alarm status	Bit 0: state of the alarm 0: inactive (return to normal) 1: active (thresholds overpassed)
3-4	Delta P	Measure of the Delta Pressure

Decoding example:

Offset	Data	Description
0	0x54	Frame code
1	0x20	Frame counter: 1 No error
2	0x01	Bit @1 so alarm is active
3-4	0x0190	400 Pa

2.2.7.2 0-10V alarm (0x56)

This frame is sent during the appearance, or disappearance, of a threshold exceeding alarm for the 0-10V input.

Offset	Data	Description
0	0x56	Frame code
1	Status	Status byte
2	Alarm status	Bit 0: state of the alarm 0: inactive (return to normal) 1: active (thresholds overpassed)
3-4	0-10V	Measure on the 0-10V input

Decoding example:

Offset	Data	Description
0	0x56	Frame code
1	0x20	Frame counter: 1 No error
2	0x01	@1 so alarm is active
3-4	0x11C6	4 550 mV

2.2.7.3 Digital inputs alarm (0x51 or 0x52)

This frame is sent if a defined number of events has been detected (configured by the user) on the digital input (only if configured as an input).

Offset	Data	Description
0	0x51 or 0x52	Frame code for Digital input 1 or Digital input 2
1	Status	Status byte
2	Digital input state	Bit 1: state of the digital input in the last frame • 0: OFF (opened) • 1: ON (closed) Bit 0: current state of the digital input • 0: OFF (opened) • 1: ON (closed)
3-6	Global counter	Restart from 0 when max is attempt
7-8	Instantaneous counter	Reset to 0 at each frame

Decoding example:

Offset	Data	Description
0	0x51	Frame code for Digital input 1
1	0x20	Frame counter: 1 No error
2	0x01	@0 = The input 1 was OFF on the last frame @1= The input 1 is ON now
3-6	0x0000017E	382 events since the startup of the device
7-8	0x0001	1 event since last frame

2.2.8 Response to Get register request (0x31)

Following reception of a downlink frame with the code 0x40, the frame 0x31 is transmitted. It contains all the values of the registers requested in the downlink frame 0x40.

Offset (in byte)	Data	Description
0	0x31	Frame code
1	Status	Status byte
2-3	Value 1	If value 1 is a 2-byte register
4	Value 2	If value 2 is a 1-byte register
5-8	Value 3	If value 3 is a 4-byte register
…		

If an error is detected in the request, the returned 0x31 frame will be empty.
Note: the size of the data registers is variable depending on the register number. Refer to the list of registers to determine the size of each one and to deduce the total size of the data returned by the 0x31 frame.

Decoding example:

Offset (in byte)	Data	Description
0	0x31	Frame code
1	0x20	Frame counter: 1 No error
2-3	0x1234	4660 (considering that value 1 is a 2-byte register)
4	0xFF	255 (considering that value 2 is a 1-byte register)
5-8	0x00000000	0 (considering that value 3 is a 4-byte register)
…		

2.2.9 Response to Set register request (0x33)

Following reception of a downlink frame with the code 0x41, the frame 0x33 is transmitted. It shows whether the downlink frame (0x41) has been received and gives information on the support status of the latter.

Offset (in byte)	Data	Description
0	0x33	Frame code
1	Status	
2	Request status	- 0x00: N/A - 0x01: success - 0x02: success – no update (value to set is the current register value) - 0x03: error – coherency - 0x04: error – invalid register - 0x05: error – invalid value - 0x06: error – truncated value - 0x07: error – access not allowed - 0x08: error – other reason
3-4	Register Id	Indicates to the user the register that caused the error (only if “Request Status” is different from 0x01).

CAUTION: if the request 0x41 concerns several registers, the device will stop the analysis of the Downlink request at the first error and will send the Status frame with the reason and the identifier of the register concerned.

In the event of an error, if a partial reconfiguration has taken place before the error was detected, the device restarts and returns to its last valid configuration. As a result, you will have to configure the device again with the new data.

Decoding example:

Offset (in byte)	Data	Description
0	0x33	Frame code
1	0x20	Frame counter: 1 No error
2	0x04	invalid register
3-4	0x018F	399: register S399 does not exist (should be S3XX)

2.2.10 Response to an output control frame (0x60 or 0x61)

Following reception of a downlink frame with the code 0x60 or 0x61, the frame 0x2F is transmitted as an acknowledgement.

Offset (in byte)	Data	Description
0	0x2F	Frame code
1	Status	Status byte
2	Status of the request	• 0x00 = N/A • 0x01 = Success • 0x02 = error - generic • 0x03 = error – state asked not recognized (not ON or OFF) • 0x04 = error – invalid request

Decoding example:

Offset (in byte)	Data	Description
0	0x2F	Frame code
1	0x20	Frame counter: 1 No error
2	0x01	Success

2.2.11 Transmit conditions

Frame code	Description	Sending conditions
0x10	Status (configuration)	• Product start up • Exit configuration mode • Reception of frame 0x01 (get product config)
0x11	Status (0-10V configuration)	• Product start up if 0-10V active • Exit configuration mode • Reception of frame 0x01 (get product config)
0x1F	Status (Digital inputs/outputs configuration)	• Product start up if Digital inputs are active • Exit configuration mode
0x20	Network configuration	• Product start up • Exit configuration mode • Reception of frame 0x02 (get network config)
0x30	Keep alive	• Periodically if no periodical data is defined • Magnet detection in PRODUCTION mode
0x51 0x52	Digital inputs alarms	• Threshold of events overpassed
0x53	Delta P Periodic data	• Periodically
0x54	Delta P Alarm	• Threshold overpassed
0x55	0-10V Periodic data	• Periodically
0x56	0-10V Alarm	• Threshold overpassed
0x31	Response to 0x40	• Reception of frame 0x40 (content of register)
0x33	Response to 0x41	• Reception of frame 0x41 (change configuration)
0x2F	Acknowledgement to 0x60 or 61	• Reception of frame 0x60/0x61 (output control)

2.3 Downlink Frame format

2.3.1 Get applicative configuration (0x01)

Offset (in byte)	Data	Description
0	0x01	Frame code

When the device receives the downlink, it will generate a product configuration frame (0x10).

2.3.2 Get network configuration (0x02)

Offset (in byte)	Data	Description
0	0x02	Frame code

When the device receives the downlink, it will generate a network configuration frame (0x20).

2.3.3 Get registers (0x40)

This frame (0x40) allows you to inform the device through the network that it must send the values of specific S3XX registers in an uplink frame (0x31).

Offset (in byte)	Data	Description
0	0x40	Frame code
1	CONFID1	Index of the register to be sent. The corresponding register is 300 + CONFIDX value.
2	CONFID2	
3	CONFID3	

IMPORTANT: the user can specify several CONF IDs in the downlink frame but it is up to the user's responsibility to verify that according to the protocol, the size of the data available in a downlink will be large enough to contain all the desired data. Otherwise, the application will send only the first values.

In Sigfox mode: backend may request to send 8 bytes in a downlink. All unused bytes should set to 0xFF to ask the product to stop the downlink frame parsing.

Coding example:

Offset (in byte)	Data	Description
0	0x40	Frame code
1	0x00	Get register S300
2	0x14	Get register S320
3	0x20	Get register S332
4-7	0xFFFFFFFF	In SFX : ignored by product

2.3.4 Set registers (0x41)

This frame (0x41) allows you to change the value of requested S3XX registers.

Offset (in byte)	Data	Description
0	0x41	Frame code
1	CONFID1	Index of the register to be changed. The corresponding register is “300 + CONFID1“
2	Value of CONF ID 1	Value to set In this example, its value is contained in 1 byte
3	CONFID2	Index of the register to be changed. The corresponding register is “300 + CONFID2”
4-5	Value of CONF ID 2	Value to set In this example, its value is contained in 2 bytes
…		

Following the sending of the downlink 0x41, the associated uplink 0x33 is immediately returned. If the update of the register(s) went well, the device will perform a backup and begin its restart procedure automatically. In addition, the Config bit of the status byte will be set to 1 in the next scheduled uplink frame (periodic or alarm or keep alive frame) if everything went well.

Coding example:

Offset (in byte)	Data	Description
0	0x41	Frame code
1	0x14	Register to modify is S320
2-3	0x00AA	Value to set in S320 is 170 (S320 is a 2-byte register)
4	0x1E	Register to modify is S330
5	0x02	Value to set in S330 is 2(S330 is a 1-byte register)
…		

2.3.5 Outputs control

The device can receive a downlink to change the state of one or both digital outputs.

2.3.5.1 Activation of Digital Outputs frame

Offset (in byte)	Data	Description
0	0x60	Frame code
1	State of the Digital Output 1	0: N/A 1: OFF 2: ON
2	State of the Digital Output 2	0: N/A 1: OFF 2: ON
3	Downlink ack request	1: a confirmation uplink is sent to indicate the status of the downlink reception (0x2F)

PAY ATTENTION: in case of erroneous data, for example if the Digital inputs are not configured as outputs, the digital state will be N/A so no action will be done and if an acknowledgement is required the device indicates ‘invalid request’ as a status in the 0x2F frame.

2.3.5.2 Temporary activation (pulse) on the digital output (0x61)

Offset (in byte)	Data	Description
0	0x61	Frame code
1	Digital Output 1 pulse duration	X0.1s
2	Digital Output 2 pulse duration	X0.1s
3	Downlink ack request	1: a confirmation uplink is sent to indicate the status of the downlink reception (0x2F)

PAY ATTENTION: in case of erroneous data, for example if the Digital inputs are not configured as outputs, the digital state will be N/A so no action will be done and if an acknowledgement is required the device indicates 'invalid request' as a status in the 0x2F frame.