Application Note
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ELSYS.se

Downlink payload specification

Sensor downlink payload

Downlink payloads are sent on the configured port + 1. If configured port is the default (5) then downlink settings should be sent on port 6.

You can find an interactive downlink generator at elsys.se/en/downlink-generator.

Payload format

Header byte (0x3E)	Payload length	Settings data	...	Settings data
1 byte	**1 bytes**	n bytes		n bytes

Settings data format

Type	Value
1 byte	0-16 bytes

Possible settings

ID (hex)	Setting	Size	Reboot	Disabled[1]	Min. version
0x01	AppSKey	16 byte key	■		
0x02	NwkSKey	16 byte key	■		
0x03	DevEUI	8 byte device EUI	■	■	
0x04	AppEUI	8 byte application EUI	■		
0x05	AppKey	16 byte key	■		
0x06	DevAddr	4 byte device address	■		
0x07	OTA	1 byte bool			
0x08	Port	1 byte			
0x09	Mode	1 byte		■	
0x0A	Ack	1 byte bool			
0x0B	DrDef	1 byte			
0x0C	DrMax	1 byte			
0x0D	DrMin	1 byte			

Elektroniksystem i Umeå AB Industrivägen 12, 90130 Umeå
E-mail: info@elsys.se I **Web:** www.ELSYS.se

ID (hex)	Setting	Size	Reboot	Disabled	Min. version
0x0E	Payload	1 byte		■	
0x0F	Power	1 byte		■	
0x10	ExtCfg	1 byte	■[2]		
0x11	PirCfg	1 byte			
0x12	Co2Cfg	1 byte			
0x13	AccCfg	4 byte config			
0x14	SplPer	4 byte period	■[3]		
0x15	TempPer	4 byte period			
0x16	RhPer	4 byte period			
0x17	LightPer	4 byte period			
0x18	PirPer	4 byte period			
0x19	Co2Per	4 byte period			
0x1A	ExtPer	4 byte period			
0x1B	ExtPwrTime	4 byte time (ms)			
0x1C	TriggTime	4 byte time (s)			
0x1D	AccPer	4 byte period			
0x1E	VddPer	4 byte period			
0x1F	SendPer	4 byte period			
0x20	Lock	4 byte lock code			
0x21	RFU	4 byte, not used		■	
0x22	LinkCheck	4 byte link threshold, period			
0x23	PressPer	4 byte period			
0x24	SoundPer	4 byte period			2.3.0
0x25	Plan	1 byte channel plan	■		2.3.0
0x26	SubBand	1 byte channel plan sub-band	■		2.3.0
0x27	LBT	1 byte Listen-Before-Talk mode			2.3.0
0x28	LedCfg	1 byte led config			2.3.2
0x29	CO2Action	1 byte CO2 action (force abc, factory)			2.3.2
0x2A	WlPer	4 byte period			2.3.3
0x2B	ReedPer	4 byte period			2.3.3
0x2C	ReedCfg	4 byte reed switch config			2.3.3
0x2D	PirSens	1 byte PIR sensitivity level			2.3.7
0x2E	QSize	1 byte queue size			2.3.7

2 Reboot is enforced from version 2.3.0.

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ID (hex)	Setting	Size	Reboot	Disabled	Min. version
0x2F	QOffset	1 byte queue offset (bool)			2.3.7
0x30	QPurge	1 byte queue purge (bool)			2.3.7
0xF0	Custom1	4 byte custom data			2.3.5
0xF1	Custom2	4 byte custom data			2.3.5
0xF2	Custom3	4 byte custom data			2.3.5
0xF3	Custom4	4 byte custom data			2.3.5
0xF4	NFCDisable	1 byte NFC forced off (bool)			2.3.3
0xF5	Sensor	1 byte sensor type			2.3.2
0xF6	Output	2 bytes output settings[4]			2.3.0
0xF7	Pulse1	4 bytes pulse counter value			2.3.0
0xF8	Pulse2	4 bytes pulse counter value			2.3.0
0xF9	Settings	0 bytes, request sensor settings			2.3.0
0xFA	EXT/LED	4 bit ext mode, 4 bit LED mode[5]			
0xFB	Version	2 byte version number		■	
0xFC	Sleep	4 byte forced sensor sleep (s)			
0xFD	Generic	1 byte length, x byte NFC string			
0xFE	Reboot	0 bytes	■		

4 See appendix 2 for possible output settings.

5 See appendix 1 for available EXT/LED modes.

Examples

Reboot sensor only

3E	01	FE
Header	Length of settings	Reboot

Payload: **3E01FE**

Set application settings

3E	1C	05 2B7E1...F4F3C	04 00...00	07 01
Header	Length of settings	Set AppKey (16 bytes)	Set AppEUI (8 bytes)	Enable OTAA

Payload: **3E1C05**2B7E151628AED2A6ABF7158809CF4F3C**04**0000000000000000**07**01

Lock/unlock sensor

3E	05	20 1234FF00
Header	Length of settings	Unlock/lock

Payload: **3E0520**1234FF00

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Appendix 1 – Ext/LED control

Structure

FA	**0**	**0**
Type (Ext/LED control)	4 bit EXT mode	4 bit LED action

EXT modes

Mode	**Value (hex)**
Force output off (persistent)	0x0
Force output on (persistent)	0x1
Remove persistent output setting	0x2
Set output off (non-persistent)	0x3
Set output on (non-persistent)	0x4
Force IO2 output off (persistent)	0x5
Force IO2 output on (persistent)	0x6
Remove persistent IO2 output setting	0x7

LED actions

Mode	**Value (hex)**
LED off	0x0
LED on, green	0x1
LED on, red	0x2
LED on, orange	0x3

LED actions can be chained, see example payload below;

Green, 1s on, then off

3E	**04**	**FA** 21	**FA** 20
Header	Length of settings	LED green	LED off

Payload: **3E04FA**21**FA**20

Appendix 2 – Output settings

These settings are designed to be used on the ELT-2 with a ELT-MOD-EXT attached. Usage without this module may have undefined behavior and is not supported. The command will be ignored if sent to a device incapable of having the module fitted. See the ELT-MOD-EXT product sheet for more information.

Structure

F6	**0**	**000**
Type (Output settings)	4 bit output mode	12 bit output value

Output modes

Mode	**Value (4-bit, hex)**	**Output value (12 bit)**
Restore normal behavior (IO1)	`0x8`	Not used
Restore normal behavior (IO2)	`0x0`	Not used
IO2 on-off mode	`0x1`	0 = Off, 1 = On
IO2 PWM output mode	`0x2`	0-4095 steps, 0-10V range

Examples

IO2 5V output

3E	**03**	**F6** 2	**800**
Header	Length of settings	IO2 PWM output	2048 = 5V (approx.)

Payload: **3E03F6**2800

IO2 on-off output

3E	**03**	**F6** 1	**001**
Header	Length of settings	IO2 on-off output	Output on.

Payload: **3E03F6**1001

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