xignal

Documentation

DimoSystems Xignal

LoRa nodes communication reference

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Contents

Communication Reference version changes

Version 1.0.1:

- Initial version

Version 1.1:

- The trap_info now sends 24 hours' worth of temperatures
- Added msgID to the trap_info to distinguish between different LoRa packages

Version 1.2

- Correction on byte number
- battPercentage is now reserved

Version 2.0

- Addition of "1234" (power up) and "4321" (ranging) messages

Version 2.1

- Change of the powerup message "1234" to a custom "0x21<payload>" type message
- Change of the ranging message from "4321" to the normal "0x21<payload>" type message

Version 3.0

- Majority of temperature data removed
- Changed msgID to 0x22
- Removal of reserved byte from payload
- Moved original 0x21 message to Appendix A
- *Documentation only*: power-up payload turned off. *This was added in 2.1, but not noted in the changelog*

Communication

Power up payload

During the initial power-up, or after a reset, an initial payload is sent. This message consists of the normal 0x22 payload, with 0xFFFF for the temperature data, and 0x08 as trapState. This message is mainly for the LoRa Certification procedure and to send an initial “I’m alive” message. It is currently *turned off* in the firmware, as it resulted in longer startup- and reset times, and the certification procedure can be triggered by pressing the ranging button, but it should still be handled in case it is decided to turn this feature back on.

Normal operation payload

This payload is sent daily, when the trap closed or when the trap is opened (when the ranging is performed).

```
typedef struct {
        uint8_t msgID;
        uint8_t battVoltage;
        int16_t temperature;
        uint8_t trapState;
        uint8_t ID[6];
} trap_info;
```

trap_info						
Byte 0	1	2	3	4	5 (…)	(…) 10
msgID	battVoltage	temperature		trapState	ID	

Definition	Byte	Type	Description
msgID	0	uint8_t	Always 0x22, to easily distinguish this packet from other LoRa packets
battVoltage	1	uint8_t	Battery voltage with 1 decimal place (unit: V) e.g. If battVoltage = 29 (0x1D), the battery voltage is 2.9V
temperature	2-3	int16_t	The current temperature with 2 decimal places (unit: °C) e.g. If temperature = 1250 (0x04E2), the temperature is 12.50°C
trapState	4	uint8_t	The current state of the trap, only the lowest 3 bits are relevant, see below
ID	5 (LSB) - 10 (MSB)	uint8_t[6]	6-bit trap Identifier

The trapState has only 3 relevant bits, which are the 3 least significant bits. Bit 0 and 1 correspond to the state of the Pad (no catch/catch) and Trap (closed/opened) respectively, and bit 2 is to communicate the presence of errors.

Description:

HEX	Bit	Pad	Trap	State
0x00	0000	Released (no catch)	Closed	**Failed**: No mouse was caught, but the trap is closed. Either the mouse escaped, or something else triggered the trap
0x01	0001	Released (no catch)	Opened	**Normal:** The trap is ready to trap a mouse
0x02	0010	Pressed (catch)	Closed	**Trapped:** A mouse was caught by the trap
0x03	0011	Pressed (catch)	Opened	**Abnormal:** The trap reports a catch, but the trap has not been closed, which should never happen
0x04	0100	Undetermined (error)	Undetermined (error)	**Moved:** The on-board accelerometer has determined the trap has been moved by something other than the trap closing
0x05	0101	Undetermined (error)	Undetermined (error)	*Reserved*
0x06	0110	Undetermined (error)	Undetermined (error)	*Reserved*
0x07	0111	Undetermined (error)	Undetermined (error)	**Error:** Generic/Unknown error has occurred; the trap should be checked
0x08	1000	X	X	**Wakeup:** This is sent with the wakeup

Appendix A: Legacy 0x21 payload message

Normal operation payload

This payload is sent daily, when the trap closed or when the trap is opened (when the ranging is performed).

```
typedef struct {
        uint8_t msgID;
        uint8_t battVoltage;
        uint8_t battPercentage;
        int16_t temperature[24];
        uint8_t trapState;
        uint8_t ID[6];
} trap_info;
```

trap_info							
Byte 0	1	2	3 (…)	(…) 50	51	52 (…)	(…) 57
msgID	battVoltage	reserved	temperature		trapState	ID	

Definition	**Byte**	**Type**	**Description**
msgID	0	uint8_t	Always 0x21, to easily distinguish this packet from other LoRa packets
battVoltage	1	uint8_t	Battery voltage with 1 decimal place (unit: V) e.g. If battVoltage = 29 (0x1D), the battery voltage is 2.9V
0x00	2	-	Reserved
temperature	3-50	int16_t[24]	Temperatures over the last 24 hours with 2 decimal places (unit: °C) e.g. If temperature = 1250 (0x04E2), the temperature is 12.50°C
trapState	51	uint8_t	The current state of the trap, only the lowest 3 bits are relevant, see below
ID	52 (LSB) -57 (MSB)	uint8_t[6]	6-bit trap Identifier

The trapState has only 3 relevant bits, which are the 3 least significant bits. Bit 0 and 1 correspond to the state of the Pad (no catch/catch) and Trap (closed/opened) respectively, and bit 2 is to communicate the presence of errors.

Description:

HEX	Bit	Pad	Trap	State
0x00	0000	Released (no catch)	Closed	**Failed**: No mouse was caught, but the trap is closed. Either the mouse escaped, or something else triggered the trap
0x01	0001	Released (no catch)	Opened	**Normal:** The trap is ready to trap a mouse
0x02	0010	Pressed (catch)	Closed	**Trapped:** A mouse was caught by the trap
0x03	0011	Pressed (catch)	Opened	**Abnormal:** The trap reports a catch, but the trap has not been closed, which should never happen
0x04	0100	Undetermined (error)	Undetermined (error)	**Moved:** The on-board accelerometer has determined the trap has been moved by something other than the trap closing
0x05	0101	Undetermined (error)	Undetermined (error)	*Reserved*
0x06	0110	Undetermined (error)	Undetermined (error)	*Reserved*
0x07	0111	Undetermined (error)	Undetermined (error)	**Error:** Generic/Unknown error has occurred, the trap should be checked
0x08	1000	X	X	**Wakeup:** This is sent with the wakeup