

GENERAL INFORMATION

The Triangle Tag is a card that integrates with a nRF52832 Module (u-blox NINA-B112) and a selection of sensors (humidity, temperature, pressure, accelerometer, luminosity and magnetic switch). Powered by a button cell, the tag fits in a plastic casing of two sizes, depending on the battery used.

SPECIFICATIONS

Dimensions (in casing)	35mm x 35mm x 15mm or 35mm x 35mm x 20mm
Microcontroller	NINA-B112 (nRF52832)
Power consumption (average)	14 uA
Operating temperature (recommended)	0 to 60 °C
Interface	I2C
Firmware	Promistel Wirepas (DualMCU_PWS)
Power supply	CR2450 or CR2477 battery
Reed Switch MK24-B-2-OE (Optional)	
Pull-In	20-40 AT
Drop out	10-35 AT
Accelerometer LIS2DH12TR (Optional)	
Acceleration	±2g/±4g/±8g/±16g (1Hz to 5.3kHz)
Current consumption	0.5-11uA
Temperature/Humidity sensor SHT30-DIS-B (Optional)	
Typical accuracy	± 3 %RH ± 0.3 °C
Current consumption	0.2-600uA
Luminosity sensor ISL29023IROZ (Optional)	
Current consumption	0.3-85uA
Visible light range	0.96 to 64 000 Lux
Air pressure sensor DPS310 (Optional)	
Operation range	300-1200 hPa
Current consumption	1.7 uA Pressure 1.5 uA Temperature 0.5 uA Standby

CONTACT INFORMATION

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PWS DESCRIPTION AND INFORMATION

Application ID (For OTAP): 0x505212

Default Network: 0xCAFE

Default Channel: 1

SENSOR DATA FORMAT

When possible the used format is an integer. To obtain the correct value, divide the integer by the used factor.

Temperature (EP 112)

Signed short: Integer representing the temperature in 100th of degree.

Humidity (EP 114)

Unsigned short: Relative humidity in 100th of %.

Atmospheric pressure (EP 116)

Unsigned long: representing Pressure in Pascal.

Shock detection Extended (EP 127)

Param 1 (unsigned byte): the state:

* 0: sensor was stationary, and it is still stationary.

* 1: sensor was stationary, and it is moving now.

* 2: sensor was moving, and it is stationary now.

* 3: sensor was moving, and it is still moving.

Param 2 (unsigned short): move duration in seconds. (Meaningful for state 2 & 3)

Param 3 (unsigned byte): number of moves. (Meaningful for state 2 & 3)

Param 4 (3 signed bytes): acceleration state. (One byte per axis X/Y/Z - Meaningful for state 0 & 2)

Acceleration value is the MSB of a 12 bits value. And the result is in mG.

Neighbor RSSI (EP 192) ([see command Type 16](#))

The message is an array of the following structure, for each node detected.

Unsigned long : address of the detected node.

signed short: RSSI in dBm.

signed byte: tx power in dB.

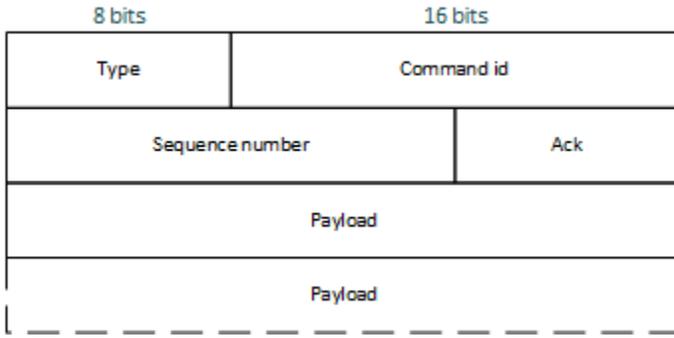
unsigned byte: reserved.

Neighbor count (EP 193)

Unsigned byte: number of neighbors detected during a network scan.

PWS COMMAND FORMAT

A PWS command is a message with a source EP set to 10 (command message) and a destination EP NOT set to 10. The Wirepas packet payload must use the following format.



Type is the command type. It tells the payload format which can vary depending on the needs of the device. Command id is the identification between the command and possible acknowledgements and responses. Sequence number is used when command or response is separated to multiple radio packet. Ack field tells whether the command needs to be acknowledged and responded. Payload can be up to the 96 bytes.

First bit of sequence number tells whether the packet is the last packet of the command/response. If the bit is 1, then there are more packets coming for this command/response.

Ack field is using only two last bits. Last bit tells if the command requires acknowledgement, and node should then acknowledge the command with the same ack bit 1. Second bit is for requiring response, and similar way in the response packet the second bit of ack field should be 1.

COMMANDS LIST

Debug (Type 1)

Enable/Disable debug messages

Param 1 (1 Byte): 0 or 1 -> Debug enabled or disabled

Reboot (Type 2)

Request a reset of the device

Param 1 (1 Byte): 0 (reboot of the device) or 1 (try first to reset sensors only, and reboot device if it fails)

Set Period (Type 10)

Time in seconds between each message. It usually refers how often a sensor will send its data.

The nodes store also 3 additional values that are optional in the message, if some sensors require different timings.

Param 1: (4 bytes) The new period in seconds

Param 2: (4 bytes – optional) The new optional period 1 in seconds

Param 3: (4 bytes – optional) The new optional period 2 in seconds

Param 4: (4 bytes – optional) The new optional period 3 in seconds

Set Output pin state (Type 11)

Change the state of the selected pin (if not used by the application)

Param 1 (1 Byte): 0-31 -> Pin number

Param 2 (1 Byte): 1 or 0 or FF-> High or Low or Free the pin

Read Input pin state (Type 12)

Request the device to send the state of the pin (if not used by the application)

Param 1 (1 byte): 0-31 Pin number

Param 2 (1 Byte): 0: No Pull, 1: Pull Down, 3: Pull Up

Returns (1 byte): 1 or 0

Set interrupt to pin (Type 13)

Associate a message to a pin (if not used by the application)

Param 1 (1 byte): 0-31 Pin number

Param 2 (1 Byte): 0: No Pull, 1: Pull Down, 3: Pull Up

Param 3 (1 Byte): 0: OnToggle, 1: LoToHi, 2: HiToLo or FF: Free the pin

Returns (2 bytes) on each interrupt:

Byte 1: The pin number

Byte 2: 1 or 0, the value of the pin

Set UICR value (Type 14)

Write in the permanent memory of the device the value. This value can be used to identify the device, software version, deployment site... by the application. Or simply written to be read later through a PWS command.

Param 1 (1 byte): 0-31

Param 2 (4 byte): The value

Read UICR value (Type 15)

Returns the value in the specified register

Param 1 (1 byte): 0-31

Returns (4 byte): The content of the value

Get Neighbor list (Type 16)

Returns the value in the specified register

Returns (n * 7 byte): Returns the list of neighbors

Set PWM to pin (Type 17)

Associate a PWM sequence to a pin. A sequence is a duration with a duty cycle "On" followed by a duration with a duty cycle "Off", in a loop.

Param 1 (1 byte): 0-31 Pin number

Param 2 (1 byte): The number of loops (0 is a special case, for a fixed PWM configuration)

Param 3 (1 byte): 0-100 the duty cycle for "On"

Param 4 (1 byte): 0-100 the duty cycle for "Off"

Param 5 (2 bytes): The duration of the "On" cycle in ms

Param 6 (2 bytes): The duration of the "Off" cycle in ms

For a fixed configuration (loops == 0) param 4->6 are ignored

Note that the pin will remain used with the fixed configuration. To free it, a sequence must be used (1 loop, with 0ms durations is ok).

Set Epoch Time (Type 18)

Initialize internal "epoch" timer

Param 1 (4 bytes): current "Epoch" time

Set Accelerometer Threshold (Type 19)

Change accelerometer shock detection setting, if available

Param 1 (2 bytes): Minimum shock acceleration in mg