LoRaWAN® and NFC enabled IoT-Sensor Family
STx-LR

First of a kind IoT-sensor tag/ IoT-button in a very compact form factor and long-lasting battery through ultra low power consumption.

The n-fuse STx-LR family of IoT-sensor and IoT-button possesses some distinguishing features:

Key Features

- Compact housing
- Appealing industrial design
- IP54 rated enclosure
- Residue-free adhesive tape based mounting
- Dual wireless interface with LoRaWAN and NFC for configuration and commissioning
- Ultra low power optimized to enable long battery life of 10+ years is possible
- Optional: Secure element for secure key storage and encryption
- Open source firmware and bootloader
- Possibility to re-program the device (programmer adapter available)
- Environmentally friendly through easily replaceable battery
- RF Output power of up to 14 dBm
- Firmware upgrade and device configuration via NFC
- Android OS based mobile app for management
- With custom firmware: freely programmable NFC tag providing NDEF records to mobile devices

Variants

"Action"

Is an IoT-button based on a tactile switch which can is used to detect the following three gestures:

- single press
- double press
- long presses

"Multisensor"

Is capable of sensing the following measurements:

- Environment
  - Temperature
  - Humidity
- Motion (acceleration)
- Magnetic field sensitive reed switch (normally open)
- Ambient light

Triggers can be configured for the following sensor readings based on thresholds:

- Environment
  - Temperature
  - Air pressure
- Motion (acceleration)
- Ambient light

This allows the device to only send data when a defined threshold is exceeded.

"Environment"

Is capable of sensing the following measurements:

- Temperature
- Humidity
- Air pressure
- Air quality based on VOCs

Security

Optional: The ATECC608A secure element is the foundation of the device's security. It is used for the various key calculations like during the network join. Once the join is performed, no secrets leave the chip again.

Upon request: *The Things Industry* Join Server service readiness out of the box based on pre-provisioned secure element.

Application Areas

- Internet of Things (IoT) and Industrial Internet of Things (IIoT) Applications
- Home-, building-, industrial- automation, monitoring and control
- Smart city
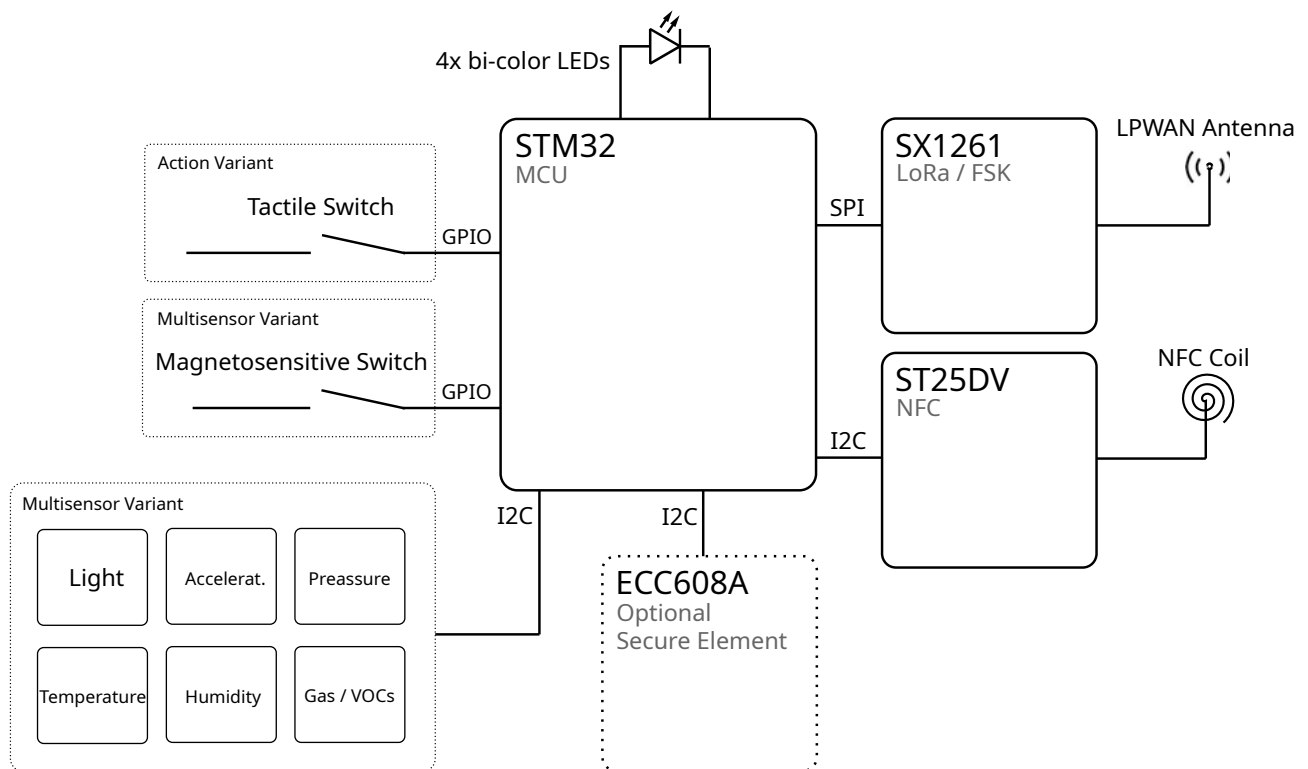- Motion, temperature, ambient light, motion based alerting

Specifications

Category	Feature	Description
LPWAN Radio	Semtech Radio	SX1261
	Modulation	LoRa®
	Protocol	LoRaWAN® 1.0.4 LoRaWAN® Regional Parameters RP002-1.0.4
	Channel Plans	AS923-1 AS923-2 AS923-3 AS923-4 AU915 CN470 CN779 EU433 EU868 IN865 KR920 RU864 US915
	LoRaWAN Device Class	A
Near Field Communication (NFC)	STMicroelectronics ST25DV	4 Kbit EEPROM NFC Forum Type 5, ISO 15693 compatible
MCU	STMicroelectronics STM32	STM32L071KZU6 • Cortex-M0+ Core • 192 KiB Flash • 20KiB RAM • 32 MHz
Action Variant "sta"	Tactile Switch	Software based gesture detection for: • single press • double press • long presses
Multisensor Variant "stx"	Multiple Sensors	Environment: Texas Instruments HDC2080 • Temperature • Humidity Motion (acceleration): Bosch BMA400

Category	Feature	Description
		Magnetic field sensitive reed switch (normally open)
		Light: Osram/ AMS SFH 7776 • Ambient light • Infrared light barrier
		Support for threshold based triggering for: • Temperature (upper or lower) • Humidity (upper or lower) • Ambient light • Motion
Environment Variant "ste"	Environment Sensor	Environment: Bosch BME680 • Temperature • Humidity • Pressure • Air quality based on VOCs
Connectors	Connector Type	TC2030 Programming and debugging header
Power Source	Coin Cell	CR2430, 3 V
RF	Frequency Range	863 to 928 MHz
	Max RF Output Power	Up to +14 dBm
	Antenna	3D arc antenna
Status Indication	4x bi-color LEDs	green and red
Firmware	For MCU (STM32)	Can be updated via NFC. Open Source Bootloader and Firmware available at: https://github.com/nfhw/stm32-nfc-update-bootloader https://github.com/nfhw/stx-firmware ⚠ Modifying the firmware voids the warranty.
Management	Mobile App for Android OS	https://play.google.com/store/apps/details?id=co.nfuse.sensormaster
Mounting		Adhesive tape ring (included)
Power	Coin Cell Battery	CR2024, replaceable
Operating Conditions	Temperature (operating)	0 to +40° C Limited by battery cell.
	Humidity	10% ~ 90% RH Non-condensing
Protection Class	Ingress Protection code	IP54 (dust/ spray water)

Category	Feature	Description
Physical Properties	Dimensions WxHxD	sta-Variant: 40.9 x 40.9 x 16.8 mm stx-variant: 40.9 x 40.9 x 14.4 mm without adhesive tape
	Weight	sta-Variant: 17 g stx-variant: 16 g without adhesive tape
Regulatory	Certifications	CE (Radio Equipment Directive 2014/53/EU)
	Materials	RoHS, REACH
Warranty		12 months for B2B customers 24 months for B2C customers
Customization	Options	• Branding on label, packaging • Custom mobile app • Enclosure color • Pre-configuration/ provisioning • Custom firmware • Different sensors and combinations thereof

Block Diagram

Battery Life

Example for STa and STx (without IR emitter enabled):

- 2 transmissions a day: > 10 years.
- 24 transmissions a day: > 2 years.

Connectors

- Battery contacts
- TC2030 programming header

Product Family Portfolio

Part Number / Variant	Description	Availability
sta-lr	action variant with a tactile switch.	January 2021
stx-lr	multisensor variant with five sensor measurements.	January 2021
ste-lr	environment sensor with Bosch BME680.	January 2021
Custom variants		upon request

Ordering Information

All n-fuse products can be ordered directly through the n-fuse website.
You can also contact a sales representative via devices-sales@n-fuse.co for volume ordering.

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