MONITORING GOODS WITH SENSING NFC AND UHF TAGS

This solution, based on NTAG® SmartSensor technology, extends the visibility of product parameters — allowing you to follow not only temperature, but shock, vibration, orientation, and humidity. Brands can extend their label by getting on board with NFC and UHF tags, all with the help of our starter kit.

TARGET APPLICATIONS

- Medical supplies
- Industrial components used in aerospace and automobile
- Valuable fragile goods
- Raw material supplies
- Logistics of valuable, perishable goods (inc. wine, seafood, fish, etc.)

HANDLING GOODS

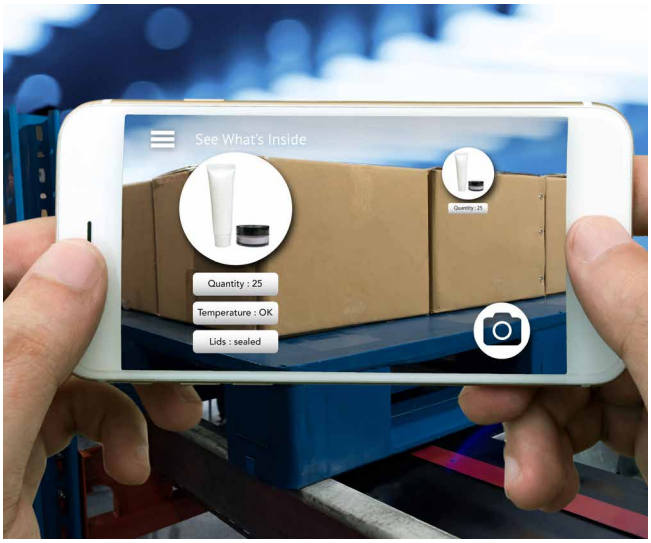
In today's industrial environment, lots of goods are shipped across the world, coming out of dedicated production plants to the end-assembly plants. Products like cars and planes are jewels of industrial quality, but the use of improperly handled parts can cause both assembly issues and functionality risks.

Given that business moves fast, and always must be kept on time, there is a lot of time-pressure on the logistic chains; increasing the risk of handling incidents.

By monitoring the handling of goods all the way through the production and distribution process, our small sensor makes it possible to identify damaged or poorly handled goods. Sensors can be read out at various hand-over points in a multi-modal logistic chain, providing vital information for the producer or buyer when an incident happens. This point of precise identification can be used to further improve the flow of goods for future shipments.

LOGISTIC HANDLING SENSOR

Our solution, based on the NTAG smart sensor — combined with an MEMS accelerometer and a humidity sensor provides information about the environmental



conditioning (temperature and humidity) and the handling of goods (shocks, orientation and vibration).

Through NFC and RAIN RFID interfaces, it is possible to check and assess the collected data during transport, enabling full visibility throughout the supply chain.

SOLUTION OFFERING

This solution contains 3 NXP ICs connected via I2C: the NHS3100, the FXLS897X and the SL3S4011FHK. The FXLS897X is a compact 3-axis MEMS accelerometer optimized for low power operation. The SL3S4011FHK is a UCODE-I2C IC. The starter kit also includes a third-party humidity sensor.

The NHS3100 is the master of the solution. It controls the monitoring of different sensor values: temperature, shock, vibrations, tilting and humidity. Through the UHF interface, one sees the identity of the goods along with the status of handling. Via NFC, the sensors are selected, activated and started. NFC is also used to upload the logged values and events to the cloud.

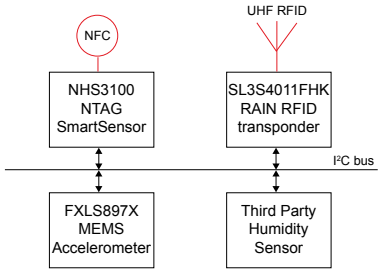
KEY FEATURES

- ISO14443 NFC interface, fully NFC Forum tag type 2 compliant
- RAIN RFID compliant solution
- EPCglobal 1.2.0 standard
- Open Arm® Cortex® M0+ allowing flexibility and application customization
- LPCXpresso-based SDK with example applications for application development
- Large non-volatile memory invisible from the NFC interface
  - Customers can implement application-specific access control privileges
  - Dedicated data compression allows you to easily store 30,000+ data points
- Integrated PMU allows operation from battery or the NFC interface
- Low-leakage battery switch controlled in SW, allowing battery connection during production
- Battery-powered application starts with NFC command, no mechanical switch handling needed.
- Individually calibrated temperature sensor
  - ±0.5 °C absolute accuracy between −40 °C and 0 °C
  - ±0.3 °C absolute accuracy between 0 °C and +45 °C
  - ±0.5 °C absolute accuracy between +45 °C and +85 °C

Temperature recalibration is not required for applications that need either accuracy profile.

- MEMS accelerator features and benefits
  - ±2, 4, 8, and 16g user-selectable, full-scale measurement ranges
  - 12-bit acceleration data
  - 8-bit temperature sensor data
  - 12-bit vector magnitude calculation
  - Flexible Sensor Data Change Detection (SDCD) function to detect motion, high-g/low-g, freefall, and other inertial events
  - Autonomous orientation detection function (Portrait/Landscape/Up/Down)
  - Low noise: 280 µg/√Hz in high performance mode
  - Low power capability:
    - ≤ 1 µA IDD for output data rates (ODRs) up to 6.25 Hz
    - < 4 µA IDD for output data rates up to 50 Hz
  - Selectable ODRs up to 3200 Hz; Flexible Performance mode allows for custom ODRs
- NFC phone compatibility
  - Android 5 or newer
  - iOS11 or newer for iPhone 7/7plus and newer models

SOLUTION BLOCK DIAGRAM



SOLUTION CUSTOMIZATION

With the starter kit (NHS3100SENSORADK; 12NC: 935380802598) and the NHS3100SENSOR SDK, customers can evaluate this solution and develop their own differentiating solution.

This kit contains:

- The NHS3100SENSOR demo board, the LPClink board, and the necessary cables to develop firmware on both PC as MAC
- A desktop application that reads out multiple NHS3100SENSOR demo boards, and displays the monitoring status per board.
- A desktop application to configure, start and stop, and read out the data logs.
- The example source code: data logger firmware on the NHS3100, the source code for both the Android and the iPhone APPs

Extra NHS3100SENSOR demo boards can be purchased separately. Ordering information: NHS3100SENSORDB, 12NC: 935378448598.

PACKAGES

- NHS3100
  - HVQFN24, WLCSP25 or W8 (8 gold bumps)
- FXLS897X
  - 2 mm x 2 mm x 0.95 mm 10-pin DFN package with 0.4 mm pitch and wettable flanks
- SL3S4011FHK
  - Plastic extremely thin quad flat SOT902-3 package; no leads, 8 terminals, body 1,6 x 1,6 x 0.5 mm

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NTAG SmartSensor