Creating visibility in the logistics chain

Combined NFC and UHF RFID Solution for Temperature Monitoring

This solution extends the current NTAG SmartSensor offering for temperature logging with the option to verify the state over UHF RFID. With the starter kit, early adopters can extend their offering with UHF while maintaining their NFC value proposition.

TARGET APPLICATIONS

▸ Valuable perishable good logistics: wine, seafood, fish, cut flowers

▸ Pharmaceutical drug delivery: vaccines, insulin, biologicals and biosimilars

▸ Chemical compounds like glues and resins

▸ Medical goods like stents

▸ Blood

TEMPERATURE SENSITIVE PRODUCTS

With the advance of e-commerce and e-retail, the logistics flows are changing. While shipments in the traditional model towards retail and supermarkets were homogeneous from a condition handling point, in this new model, shipments now contain various goods, and these goods might have to be handled under different temperature conditions.

Take a normal household that orders its weekly supply; the shipment will be a mixture of fresh food like vegetables and fruit, deep freeze goods, wine, and meat. These goods all need to be handled at a different temperatures. Selling parties and their distribution/delivery partners will have to implement solutions to deliver these goods, and customers, as recipients, will want to check the correct treatment as they are becoming increasingly concerned about the quality of their goods. On top of this, governments and regulators are increasingly developing regulations.

To optimize these kinds of flows, items will be tagged at the item level. In order that both the professional logistics stakeholders and the consumers can check the goods, one needs to go to a dual technology solution: UHF RFID, as it is the current way-of-working for track and trace of large logistical flows, and NFC, as it is an intuitive technology available on most smartphones.

SOLUTION OFFERING

This solution is composed of two NXP ICs, the NHS3100 and the SL354011FHK; connected via I²C. The NHS3100 is the master of the solution, running the temperature monitor and forwarding the state of the controlled goods to the UHF interface. The logger is configured and started via the NFC interface. The data collection also happens via NFC and is uploaded via an NFC-enabled smartphone to the cloud. On the UHF interface, the package is identified via its NFC UID and a status indication is given. That state information can be simple for example, ok or not ok, but as an example and depending on the firmware, the incident timing can be displayed.

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 solution development

▸ Large non-volatile memory invisible from the NFC interface

– customers can implement solution-specific access control privileges

– Dedicated data compression allows to store easily 36000 or more data points.

▸ Integrated PMU allows operation from battery or harvested from the NFC interface

▸ Low-leakage battery switch controlled in SW, allowing battery connection during production

▸ Battery-powered application started with NFC command, no mechanical switch handling needed.

▸ Individual calibrated temperature sensor

– Absolute accuracy of 0.3°C in the range of 0 to 40°C

– Absolute accuracy of 0.5°C in the range of -40 to 0°C and 40 to 85°C

▸ NFC phone compatibility

– Android 5 or newer

– iOS11 or newer for iPhone 7/7plus or newer models

▸ Packages

– NHS3100

-- HVQFN24, WLCSP25 or W8 (8 gold bumps)

– SL354011FHK

-- Plastic extremely thin quad flat SOT902-3 package; no leads, 8 terminals, body 1,6 x 1,6 x 0.5 mm

SOLUTION CUSTOMIZATION

With the starter kit (NHS3100UCODEADK; 12NC: 93562162598) and the NHS3100UCODE SDK, customers can evaluate this solution and develop their own differentiating solution.

This kit contains:

▸ The NHS3100UCODE demo board, the LPClink board and the necessary cables to develop firmware on both PC as MAC

▸ A desktop application that reads out multiple NHS3100UCODE demo boards and displays the temperature 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 NHS3100UCODE demo boards can be purchased separately. This is the ordering information: NHS3100UCODEDB, 12NC: 935362163598.

Note: Till the end of 2017, the SDK will be delivered as a patch to the existing PC/Android and MAC/IOS SDKs.