Bluetooth Low Energy Proximity Key Fob Smaller Than A Credit Card

Ultra low power (ULP) RF specialist Nordic Semiconductor ASA announces that Hong Kong-headquartered Dayton Industrial Co. has now announced a Bluetooth® low energy proximity key fob based on Nordic's µBlue™ nRF8002 System-on-Chip (SoC) that is less than half the size of a credit card.

The nRF8002's class-leading ULP performance and size will enable the Dayton Bluetooth low energy proximity key fob to run for around a year from a regular 3V CR2025 lithium coin cell battery under typical (daily) usage conditions while featuring an extremely slim (0.5cm-thick) and compact (4.9 x 3.2cm) plastic sensor housing that features a single push button and two submerged LED status lights (one red to signal alerts, and one green to signal pairing status) within a product that weighs less than 40g. There are also additional micro-vibrator and buzzer alert options.

This production-ready product platform will allow OEMs and developers to develop a whole new range of both standard (Bluetooth v4.0 profile-based) and non-standard (uniquely developed) proximity, property location and security applications ('apps') for use with devices that employ Bluetooth v4.0 wireless technology such as the latest iPad and the iPhone 4S.

Bluetooth low energy is a hallmark feature of the latest Bluetooth v4.0 specification and if certain qualification requirements are met can be used to develop Bluetooth Smart devices (such as wireless sensors, peripherals, and accessories) compatible with any Bluetooth Smart Ready hub product (e.g. A smartphone, tablet/computer, and other gadget). (See 'About Bluetooth low energy, Bluetooth Smart, and Bluetooth Smart Ready' below.)

Within the latest Bluetooth v4.0 specification there are currently two profiles applicable to proximity-based property location and security:

* The Bluetooth low energy Find Me profile that targets smartphone applications

and allows users to pair small - but commonly misplaced - everyday objects with their smartphone in order to locate them via, for example, a Bluetooth low energy proximity key fob that could be used to find a misplaced phone (by pushing a button on the fob to make the phone sound an audible alert), or a misplaced key fob (by pushing a button within a smartphone app to make the key fob sound an alert).

* The Bluetooth low energy Proximity profile targets smartphones and other portable devices such as computer laptops and tablets, and further extends the functionality of the Find Me profile to include more advanced in- and out-of-range functions. This could include, for instance, the ability to trigger an automatic security lock-down if a smartphone or laptop/tablet is separated from its owner by more than a certain threshold distance, or wake a sleeping desktop computer as soon as the user sits down in front of it.

"Although these use cases are set to become hugely popular - our Bluetooth low energy key fob design platform will support practically any proximity, property location, or security application an OEM or app developer can come up with above and beyond the standard Bluetooth v4.0 profiles and use cases," comments Tony Chung, a Senior Marketing Executive at Dayton. "This could include, for example, monitoring pets to ensure they don't stray too far away from home by adding GPS functionality to the standard Find Me profile, or developing an assistance alarm that sends a signal to a smartphone to alert someone that the user is in need of help.

Chung continues: "And the low cost nature of this device means it could also be bundled free-of-charge with higher value Bluetooth v4.0 products such as smartphones and tablet computers to attract customers."

"Designing a Bluetooth low energy key fob slim and small enough to fit into a wallet and still offer around a year of battery life was not an easy task," admits Johnson Chan, Product Engineering Manager at Dayton. "It felt a bit like trying to fit a high end Italian sports car engine into a matchbox. We had to use a thinner CR2025 coin cell battery instead of a more conventional CR2032 to minimize weight and size. And in order to optimize the components placement within such a slim case, we had to move the battery from a more traditional on-PCB (printed circuit board) position to an alongside PCB location and specify exceptionally low profile supporting electrical components.

Chan continues: "We were also aware that such a product would need to be very robust given its 'anywhere anytime' potential use and offer water resistance to rain and splashing [IPX3 standard] with an operating temperature range of 0 to +50ºC and a storage temperature range of -20 to +70ºC which is extremely important if, for example, the fob is left in a car overnight in winter or during the day in the summer.

"This meant using a hermetically-sealed translucent case design to incorporate a pair of built-in flashing color LED function indicators but still allowing end users to change batteries easily via a sliding battery compartment that did not affect the water resistance or operating temperature range - which again, wasn't very easy to

do but we did eventually manage to achieve."

"Proximity-based property location and security could be one of the most popular use cases for Bluetooth low energy technology," comments Geir Langeland, Nordic Semiconductor's Director of Sales & Marketing, "because while the popularity of products such as smartphones and computer tablets has exploded over recent years - so has the security risk and potential feeling of panic at having such desirable items packed full of our most sensitive and personal data lost or stolen. This low cost and easy-to-use Dayton product platform should help address such problems and in all likelihood reach into a host of brand new proximity-based applications as well."

Bluetooth low energy has been designed from the outset to extend Bluetooth wireless connectivity to compact, coin cell-powered devices such as proximity fobs. Nordic has been at the forefront of the group that defined the Bluetooth low energy specification since becoming a foundation member of Nokia's Wibree Alliance in 2006 (the Alliance became part of the Bluetooth Special Interest Group (SIG) in June 2007). Nordic contributed decades of expertise - gained in producing successive generations of class-leading proprietary and interoperable (ANT/ANT+) ULP wireless connectivity solutions within a field that it pioneered.

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