

ultra low power


Wireless

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BLUETOOTH LOW ENERGY

SPRING ISSUE 2010

World's first single mode Bluetooth low energy module uses Nordic μ Blue

 French multi-die system-in-package (SiP) design specialist, Insight SiP, has released the world's first drop-in single mode Bluetooth low energy module. The module employs the Nordic's μ Blue ("MicroBlue") nRF8001 connectivity-on-chip solution.

This follows the Bluetooth SIG's official adoption of Bluetooth low energy in December 2009 as part of the latest Bluetooth Version 4.0 Core Specification.

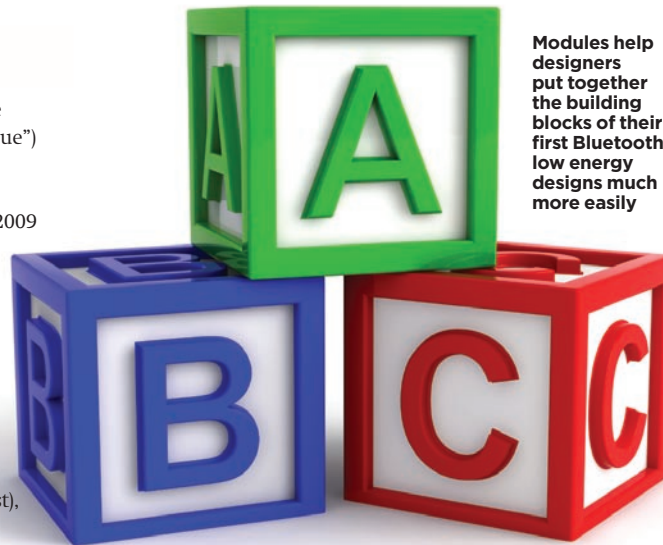
The Insight SiP ISP091201 is a completely self-contained and working Bluetooth low energy SiP module that requires minimal RF expertise to use in a product. It measures 8 by 12 by 1.4 mm.

The nRF8001 μ Blue integrates the radio, baseband and lower layers of the Bluetooth low energy software stack (PHY, Link layer, and Host), and the module adds an integrated antenna, crystal and 15 supporting passive components.

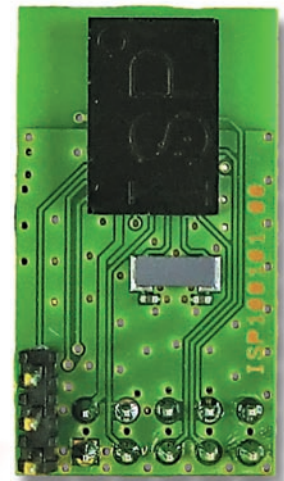
The ISP091201 will be fully compliant with FCC and CE EMC requirements and requires no other external supporting components beyond an inexpensive external 8-bit microcontroller (from any vendor and used to run the upper Profile and Application layers of the Bluetooth low energy stack) and on-board 3V power source.

The module is housed in a QFN, LGA package and is miniaturized enough to fit into highly space constrained applications such as watches, health and fitness sensors (for example, pedometer, heart-rate-, blood pressure-, and glucose-monitors), remote controls and key fob-style proximity detectors.

Because Bluetooth low



Modules help designers put together the building blocks of their first Bluetooth low energy designs much more easily



"Product developers don't need extensive RF experience to design-in our module into their first Bluetooth low energy product"

energy wireless technology is an interoperable standard, the ISP091201 SiP module will be able to communicate with both single mode Bluetooth low energy chips from other manufacturers, and dual mode Bluetooth low energy chips that are likely to become a *de facto* feature in almost all new Bluetooth-enabled cell phones and computers.

"Product developers don't need extensive RF experience to design-in our module into their first Bluetooth low energy product," explains

Diana Moncoquet, the Marketing and Sales Director at Insight SiP.

"This is particularly relevant given that Bluetooth low energy is expected to grow ultra low power wireless into brand new markets and applications where engineers may not have previous experience of RF engineering."

Further information: For more on Insight SiP's Bluetooth low energy module please turn to page 8.

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Bringing 2.4GHz wireless to the masses

nRF24LE1 and nRF24LU1+ now come with one-time programmable (OTP) memory variants making them suitable for low cost products such as toys

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Google Earth and Facebook shake up fitness sector

ULP wireless technology is hugely popular among professional athletes. But Jack Shandle asks if it can duplicate this success in the mainstream fitness market

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PC peripherals point the way for RF remotes

Ståle Ytterdal says that the technology required for next generation remotes is already being employed in PC wireless desktop mice and keyboards

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BLUETOOTH LOW ENERGY MODULES 

The race is on

Looking to beat your competition to market with a Bluetooth low energy product? A module from Insight SiP will compress project timescales. Diana Moncoquit explains



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It's an exciting time for ultra low power (ULP) wireless connectivity. Adopted by the Bluetooth SIG in December 2009, *Bluetooth* low energy is a key component of the *Bluetooth* Core Specification Version 4.0, the latest version of the *Bluetooth* standard (see page 15 this issue).

There are still some details of the specification to be ironed out, but developers can start designing in earnest safe in the knowledge that there won't be any fundamental changes to *Bluetooth* low energy's Link Controller. The Link Controller covers the Physical Layer (PHY), Link Layer (LL), and Host Controller Interface (HCI) elements of *Bluetooth* low energy.

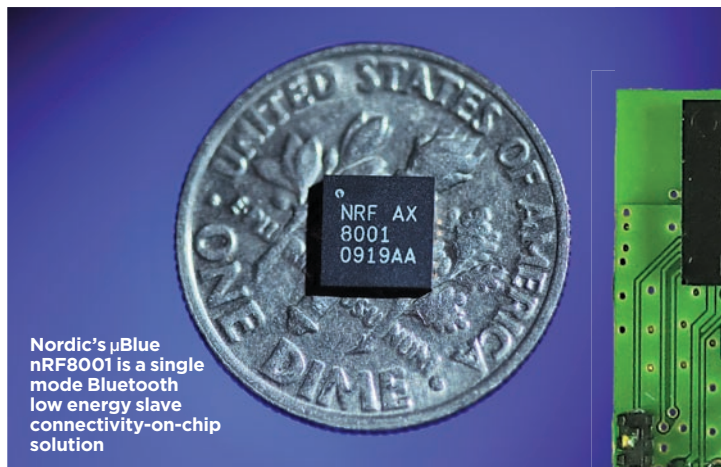
Bluetooth low energy will allow electronic device manufacturers to add interoperable, robust wireless connectivity to compact devices powered by tiny batteries (for example CR2032 coin cells). In fact, the potential of this new technology is so huge that it's going to tempt many product manufacturers who have little or no experience of RF engineering to experiment with wireless connectivity. By employing a module, those manufacturers can ease their path to market.

The advantages of a module

RF modules are a good solution for designers looking to add wireless connectivity to a product without a complex and time consuming development cycle. The company I work for – Sophia-Antipolis, France-based Insight SiP – designs and manufactures modules that are impedance matched, include antenna and are tested for range and robustness of communication. They will also be tested to US FCC and European CE electromagnetic compatibility (EMC) requirements.

By choosing a module, engineers don't need to get involved with the RF side of a design when developing, for example, a proof of concept. That saves time and money.

With clever design, it's possible to accommodate a module in a similar amount of PCB area to an equivalent transceiver (and



“The Insight SiP ISP091201 is the world's first Bluetooth low energy module”

supporting peripheral components). For example, InsightSiP's latest *Bluetooth* low energy module measures just 8 by 12 by 1.4mm.

However, modules do cost more than the equivalent discrete components although when the savings made in expensive design hours are factored in they become a much more favorable option. And this is without accounting for the several thousand dollars saved because the modules will have FCC and ETSI compliance approval.

If volumes do increase and the additional cost of the module becomes significant, it can be replaced with less expensive discrete components. Because InsightSiP's *Bluetooth* low energy module is based on Nordic's reference design, the reference design can simply be substituted in the space vacated by the module.

Nordic inside

The Insight SiP ISP091201 is the world's first *Bluetooth* low energy module – released just two months after adoption of *Bluetooth* 4.0 by the *Bluetooth* SIG.



Insight SiP ISP091201 module is based on Nordic's proven µBlue reference design

The module is based on Nordic's µBlue reference design that was made available to selected customers in November 2009. Nordic also developed a master single mode emulator that allowed Insight SiP to test the communication link of its module. As a result, the module requires minimal engineering overhead in order to incorporate it into a product as a fully functional wireless connection.

The module uses Nordic's µBlue nRF8001, a single mode, *Bluetooth* low energy slave connectivity-on-chip solution. The device is housed in a 32-pin 5 by 5 mm QFN package and boasts sub 15mA peak current consumption and microamp average current consumption. Because of this modest power demand, products using the nRF8001 will benefit from years of battery operating life from tiny coin cells (depending on duty cycle). ■

Further information: For more on Insight SiP's modules go to www.insightsip.com. For more information on µBlue go to tinyurl.com/ygzkq7d.