Socionext to Start Sample Shipment of Cost-effective, Low Power IoT Tag Device with Advanced M-FSK Modulation Compatibility for “Smart” Applications

Samples Coming in July with Production of the New SC1330A in Q4 2022

Shanghai (China), Tokyo and Yokohama, May 26, 2022--- Socionext Inc. announced sample shipment of the “SC1330A” LSI for IoT tag to start in July. The LSI was jointly developed by three companies, namely Socionext, ZiFiSense, founder of the ZETA standard for Low Power/Wide Area (LPWA), and Techsor, a board member of the ZETA Alliance in Japan. Mass production is scheduled for this December.

The SC1330A is a low cost LPWAN 2.0 LSI, and is the industry's first Advanced M-FSK LSI designed exclusively for upstream transmission. It supports Sub-GHz ISM bands such as 418 -510 MHz and 815 -930 MHz, and is competitively priced. It features low power consumption, long distance transmission, and high-speed mobile communications, making it ideal for smart IoT applications such as environmental monitoring, logistics tracking, asset management, and automated meter reading.

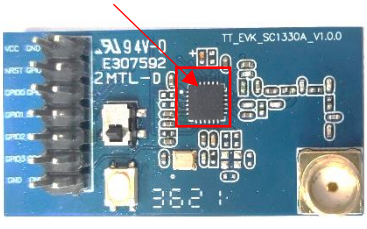
Power and Cost Reductions Come from Limiting the Device to Required Functions

Unlike devices such as NB-IoT (Narrow Band-IoT) and LoRa, Advanced M-FSK in the SC1330A supports unidirectional upstream transmission, since environmental monitoring, logistics tracking, asset management, and automated meter reading often do not require downstream communications. By focusing on upstream transmission, the SC1330A reduces costs and power consumption. It also has a carrier sense function that detects the presence of radio waves in specific frequency bands to prevent interference with other communication devices.

Backed by many years of LSI design expertise, Socionext’s SC1330A integrates in a single chip a 32-bit RISC-V core, various interfaces such as GPIO, I2C, SPI, UART, and External Interrupt, and signal processing units. It is mounted in a 4mm x 4mm QFN 24 package using high frequency signal processing and packaging technologies, which significantly reduces BOM costs, total IoT footprint, and power consumption, while improving quality and reliability.

Integration Reduces Bill of Materials Cost

SC1330A
ZETag module from ZiFiSense



The SC1330A allows users to configure IoT tags at a low BOM cost. It can be used in a wide range of cost-sensitive applications including consumer goods, asset management, and logistics tracking.

Compared with other LPWA systems, the energy efficient SC1330A consumes approximately 20 mA when transmitting at 10mW (10dBm), and achieves a communication speed of 1 kbps at a distance of 3 ~ 5 km. Such features allow for sufficient performance as an IoT tag, and can act as a low-cost, long-lasting tag by incorporating paper and coin batteries. For low-frequency communications applications such as readings from smart meters and large-scale devices

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asset management, the SC1330A features up to 10 years of life expectancy, which significantly reduces operating costs. ZiFiSense will begin mass production of the first ZETag using the SC1330A.

Advanced M-FSK with Software Defined Radio (SDR) Gateways improve Performance and Expanded Usage

The Advanced M-FSK combines ultra-narrow band communication and spread spectrum technologies. The physical layer modulation technology was originally developed by ZiFiSense with Socionext's high frequency signal processing technology. Compared with other LPWA designs, Advanced M-FSK is similar to the technology evolution of LTE/5G OFDM over CDMA (3G), and significantly improves performance. Since processing such as error correction occurs in the hardware physical layer, implementation of applications at the higher level can be easily achieved.

Advanced M-FSK specifications

Parameters	**Detail**
Modulation bit length	K [bit]
Modulation method	Advanced M-FSK
Bandwidth	SCS x 2^K
Carrier Interval	SCS
Symbol Length	1/SCS
Bit rate	*K*SCS*
Frequency utilization efficiency	$K/2^K$

SCS: Sub Carrier Space

ZETA SDR Gateway from ZiFiSense

When combined with the ZETA SDR gateway from ZiFiSense, SC1330A delivers an excellent sensitivity of -150 to -110 dBm at speeds ranging from 100bps to 100kbps, which is approximately three times the communication speed of typical methods. Also, it supports high-speed mobile communication with a transmission speed of 600bps and a transmission power of 10dBm. Since high-speed mobile communications at 100 km/h have a coverage radius of 6 ~ 10 km, the SC1330A can meet the needs of logistics, industry, agriculture, smart cities, and construction applications.

The ZETA SDR gateway's Advanced M-FSK modulation technology allows a maximum of 64 channels in a single gateway for connecting over 50,000 terminals. Compared with communication methods such as Wi-Fi and other LPWAN, ZETA SDR gateways provide greater radio transparency, lower power consumption, lower cost, higher reception sensitivity, and interference protection. In addition, the ZETA SDR gateway enables remote firmware updates, significantly reducing operational costs and supporting future ZETA technology upgrades.

Mass production will begin in calendar Q4 of 2022. The SC1330A can support a variety of protocols, it will be able to expand LPWAN world.

LSI specifications

Supported Frequency	418 to 510MHz 815 to 930MHz
Modulation	Compliant to Advanced M-FSK (2/4/8-(G)FSK)
Max Output Power	+10dBm
TX Symbol Rate	75sps to 250Ksps
TX Data Buffer	64bytes
Carrier Sense band width	2KHz,40KHz,200KHz
Integrated CPU	32bits RISC-V Processor ROM 32Kbytes(OTP) RAM 4Kbytes
Low Power consumption	TX: 22mA(+10dBm)
Interface	GPIO, I2C, SPI, UART, External Interrupt
Power Supply	+1.8 to +3.6V
Operation Temperature	-40 to +85°C
Number of Pins	24pins (pin pitch : 0.5mm)
Small Package	QFN 4mm x 4mm

About Socionext Inc.

Socionext Inc. is a global SoC (System-on-Chip) supplier and a pioneer of a unique “Solution SoC” business model through decades of industry experience and expertise. Socionext contributes to global innovation in advanced technologies including automotive, data center, networking, and smart devices. As a trusted silicon partner, Socionext delivers superior features, performance, and quality that differentiate its customers’ products and services from their competition.

Socionext Inc. is headquartered in Yokohama, and has offices in Japan, Asia, United States and Europe to lead its development and sales activities. For more information, visit https://www.socionext.com/en/.

About ZiFiSense

ZiFiSense, founded in 2013 in Cambridge, UK, is a leading provider of low-power IoT and wireless technologies. We advocate the LPWA ZETA standard and use ZETA technology in smart buildings, logistics and factories.

About Techsor

Techsor Inc. is a start-up company established in October 2016, and the sole distributor in Japan for ZETA technologies and products and a founding member of the ZETA Alliance. In collaboration with alliance companies, Techsor is promoting Digital Transformation solutions such as smart building, smart agriculture, smart logistics, and smart health care using IoT technologies. Homepage: https://techsor.co.jp