Telink BLE + IEEE802.15.4 Multi-Standard Wireless SoC

Product Brief

The TLSR8258 with internal Flash and audio support combines the features and functions needed for all 2.4GHz IoT standards into a single SoC. It supports standards and industrial alliance specifications including Bluetooth Low Energy (up to Bluetooth 5), BLE Mesh, Zigbee, RF4CE, HomeKit, 6LoWPAN, Thread, ANT and 2.4GHz proprietary standard. For some use cases, the TLSR8258 supports concurrent multi-standards.

The TLSR8258 integrates a power-balanced 32-bit MCU, BLE/802.15.4/2.4GHz Radio, 64kB SRAM, 512kB Flash, 14bit ADC with PGA, Analog and Digital Microphone input, stereo audio output, 6-channel PWM, one quadrature decoder (QDEC), flexible IO interfaces, and other peripheral blocks required for IoT (Internet of Things) applications. The TLSR8258 also includes multi-stage power management design allowing ultra-low power operation and making it the ideal candidate for wearable and power-constraint applications.
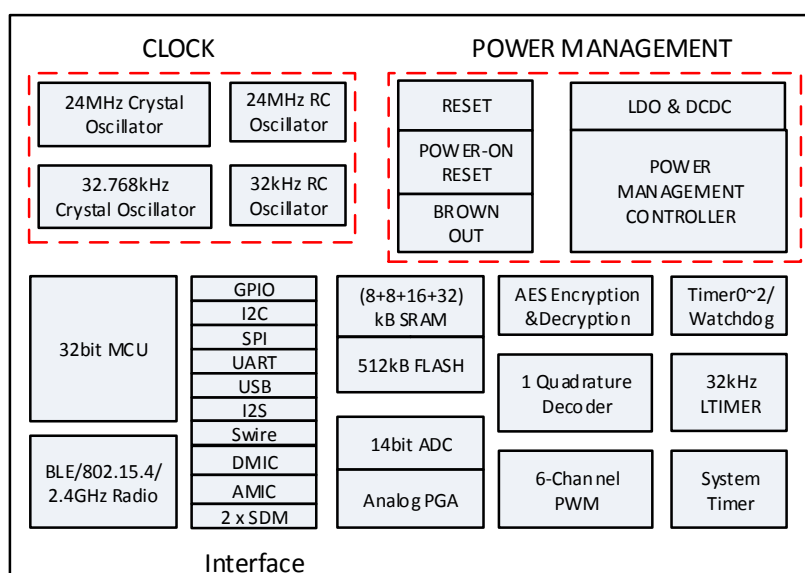
Applications

- Smartphone and tablet accessories
- Wearable devices
- Building Automation
- Consumer Electronics

- RF Remote Control
- Wireless toys
- Smart Grid
- Industrial Control

- Sports and fitness tracking
- Smart Lighting, Smart Home devices
- Intelligent Logistics/Transportation/City
- Health Care

Key Features

- 4-byte chip unique ID (UID)
- 32bit proprietary microcontroller
  - Better power-balanced performance than ARM M0
  - Instruction cache controller
  - Maximum running speed up to 48MHz
- Memory architecture
  - Program memory: 512kB Flash

- 64kB on-chip SRAM with up to 32kB retention
- Flash preloaded with UID
- Firmware protection for anti-cloning

- RF transceiver
  - BLE/802.15.4/2.4GHz RF transceiver in worldwide 2.4GHz ISM band
  - Bluetooth 5 Compliant, 1Mbps, 2Mbps, Long Range 125kbps and 500kbps
  - IEEE802.15.4 compliant, 250kbps
  - 2.4GHz proprietary 1Mbps/2Mbps/250kbps/500kbps mode with Adaptive Frequency Hopping feature
  - ANT mode
  - Rx Sensitivity: -96dBm@BLE 1Mbps, -99.5dBm@ IEEE802.15.4 250kbps, -93dBm @ BLE 2Mbps mode, -99dBm @ BLE 500kbps mode, -101dBm @ BLE 125kbps mode
  - Tx output power: up to +10dBm
  - 50 Ω matched single-pin antenna input
  - RSSI monitoring with +/-1dB resolution
  - Auto acknowledgement, retransmission and flow control
  - Support full-function BLE location features

- Power management
  - Power supply of 1.8V~3.6V
  - Battery monitor for low battery voltage detection
  - Brownout detection/shutoff and Power-On-Reset
  - Multiple-power-state to optimize power consumption

- Low power consumption
  - Whole Chip RX mode: 5.3mA
  - Whole Chip TX mode: 4.8mA @ 0dBm
  - Deep sleep with external wakeup (without SRAM retention): 0.4uA
  - Deep sleep with SRAM retention: 1uA (with 8kB SRAM retention), 1.2uA (with 16kB SRAM retention), 1.4uA (with 32kB SRAM retention)

- RTC and other timers
  - Clock source of a 24MHz&32.768kHz Crystal and 32kHz/24MHz embedded RC oscillator
  - Three general 32-bit timers with four selectable modes in active mode
  - Watchdog timer
  - A low-frequency 32kHz timer available in low power mode

- Digital and analog interfaces
  - Up to 32/17 GPIOs depending on package option
  - DMIC (Digital Mic), Dual AMIC (Analog Mic), I2S, Stereo Audio output
  - SPI, I2C, USB, Swire, UART with hardware flow control and 7816 protocol support
  - Up to 6 channels of differential PWM
  - IR transmitter with DMA
  - One quadrature decoder, two-phase input selectable from 8 pins
  - 10-channel (only GPIO input), 14-bit SAR ADC
  - 4-channel PGA, differential input
  - Low power comparator

- Embedded hardware AES and AES-CCM

- Embedded hardware acceleration for Elliptical curve cryptography (ECC)

- Hardware OTA upgrade and multiple boot switch, allowing convenient product feature roll outs and upgrades

- Operating temperature:
  - -40℃~+85℃ (ET versions)
  - -40℃~ +125℃ (AT versions)

- Completely RoHS-compliant package
  - TLSR8258F512ET48/ TLSR8258F512AT48, 48-pin QFN 7×7mm
  - TLSR8258F512ET32/ TLSR8258F512AT32, 32-pin QFN 5×5mm
- Supports all 2.4GHz IoT standards into a single SoC, including BLE, BLE Mesh, Zigbee, RF4CE, Homekit, 6LowPAN, Thread, ANT and 2.4GHz proprietary technologies
  - BLE features
    - ◇ Bluetooth 5 support
    - ◇ Long range support with 125kbps and 500kbps data rate
    - ◇ Bluetooth SIG Mesh support
    - ◇ Telink proprietary Mesh support
    - ◇ BLE location and up to 8-antenna indoor positioning support
    - ◇ Telink extended profile with audio support for voice command based searches
  - Zigbee features
    - ◇ Zigbee 3.0 platform with Zigbee 3.0 device support, compatible with ZHA and ZLL
    - ◇ Green Power support for low power devices
  - 6LoWPAN and Thread features
    - ◇ Supports 6LowPAN, IPv6 and DHCPv6
    - ◇ Supports UDP and DTLS
    - ◇ Supports thread security and commission
  - HomeKit features
    - ◇ Single-chip solution with hardware acceleration for all HomeKit security operations
    - ◇ Apple (pre-)certified Software Development Kit reference design
    - ◇ Conformant to latest HomeKit specification
    - ◇ Tested against Apple HomeKit Accessory Tester and Apple iOS 10 HomeKit HOME application
    - ◇ Support for all HAP defined services and characteristics
    - ◇ Support for custom defined HAP services and characteristics
    - ◇ HomeKit custom update over-the-air (OTA) profile for secure software upgrade over the air implemented
  - RF4CE features
    - ◇ RF4CE platform, with ZRC1.1/ZRC2.0 and MSO profile support
  - Concurrent mode: support multiple standard working concurrently, e.g. BLE + 802.15.4 based standard

Development tools

A full set of development tools for the SoC are provided, which include EVB, reference design and SDK for customers to perform evaluation, quick application prototyping and firmware development.

Company Profile

Telink Semiconductor provides highly integrated radio-frequency and mixed-signal System-On-Chip (SoC) solutions for a variety of communication and control application markets including consumer electronics, medical instruments, industrial control, home automation, smart energy, and etc.

For further information on the technology, product and business term, please contact Telink Semiconductor.

Website: www.telink-semi.com

Tel: 021 2028 1118

Email: telinkcnsales@telink-semi.com, telinkcnsupport@telink-semi.com