DHX91 Comprehensive, Feature-rich ULE system on a chip

Product Brief

Product Overview

Synaptics DHX9 1 chipset is a flexible, high-performance and highly-integrated system on a chip (SoC) for Ultra Low Energy (ULE) wireless communication, ideal for Smart Home and Smart Energy App lications such as home automation, security, monitoring, metering, healthcare and others. Combining unique ULE features with high level of integra tion and optimized connectivity to various types of sensors, as well as state of the art RF, the DHX91 is the most cost-optimized solution for Home Area Network (HAN) applications.

The DHX91 chipset includes all required functionalities of a digital baseband controller, ultra low energy module, hibernation mode, various peripherals, RF transceiver and audio and video capabilities, Chipset supports worldwide DECT/DECT ULE.

Synaptics provides complete hardware and software reference designs for the DHX91, in order to minimize development time and cost.

Product Applications

Home security and monitoring

- Safety devices like smoke, CO, and flood detectors
- Security systems like motion, glass breakage, door/ window magnet detectors
- Alarm systems like siren, strobe light
- Detectors with voice or video verification
- Surveillance system with voice and video
- Baby monitoring
- Home and remote smart control display

Home automation

- Smart plugs
- Lighting control
- Heating, ventilation, air-conditioning (HVAC)
- Home control keypad/display
- Doorbell with voice and video
- Door lock system

Healthcare

- Panic button pendant with voice
- Activity monitoring
- Patient monitoring

Consumer electronics

- Remote control
- Entertainment systems

Utility metering

- Smart grid
- Remote metering and control

Wireless audio

- Home and office communication devices

Product Benefits

- Years of battery life with Ultra Low Energy mode - 1uA during hibernation
- ULE ETSI standard compliance
- Small form factor to fit any HAN application
- Worldwide DECT 1.7 GHz-1.9GHz
- Long-range communication with RX sensitivity
- -99.5dBm, TX p ower +25.5dBm
- Highly competitive IC cost targeting mass products
- Extensive Hibernation mode with RTC, counters and debouncer, digital and analog 10 management for BOM optimizations
- High integration level for low system cost and minimal form factor
- Enabling audio and video for monitoring and safety applications
- Rich peripheral set
- Easy SW development and IP re-use with standard ARM processor
- Fast time-to-market with hardware and software reference designs

Product Features

Digital Processing Unit (DPU)

- Processor
  - 32-bit ARM 926 with MMU
  - 32KB 1 -cache and 8kB D-cache
- Embedded memory
  - 256KB program ROM
  - 128KB program/data RAM
- External memory and LCD interfaces
  - Memory mapped Ouad SPI (QSPI) Flash interface up to 104MHz
  - Two fast SPI interfaces with DMA support for serial display
  - 12C
  - Advanced master/slave PCM/TDM/IOM-2, 1 2S interface
  - Interfaces: UART, Keyboard scanner, GPIO, PWM for up to 3 LEDs

Ultra Low Energy (ULE) Unit

- Hibernation mode: low power state (1 uA)
- Up to four asynchronous wakeup events, two of which may be analog

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- Real Time Clock (RTC): for configurable hibernation period while maintaining synchronization to fixed part
- Event detection: using enhanced debouncers to avoid false detection
- Two 16-bit counters: can be used as single 32-bit counter
- Fast wakeup management from Hibernation mode
- 1/0 management during Hibernation mode (LE D, PWM, clockout, GPO)

RF Analog Processing Unit (RFAPU)

- Worldwide DECT 1.7GHz-1.9G Hz
- Embedded PA with dynamic control of output power
- RX sensitivity -98dBm, TX p ower + 25.5dBm
- Integrated MLSE to improve RX sensitivity
- DC2DC step-up and step-down conversion
- Direct two -cell battery feeding, 3V Lithium and Li-ion battery support
- Embedded regulation and generation of 4.5V, 3.3V, 1.8V and 1.2V system power supplies
- Super wide band audio codec
- Differential input and output amplifiers for microphone/line and 2x speaker/line connectivity
- Loudspeaker amplifier of up to 1W @40
- Microphone power
- Auxiliary ADC for HW and SW monitoring of various DC sources
- Automatic low-cost charger control
- Two PWM outputs with closed-loop control
- Embedded temperature sensor

Package

QFN68 (8x8) or QFN88 (10x10)

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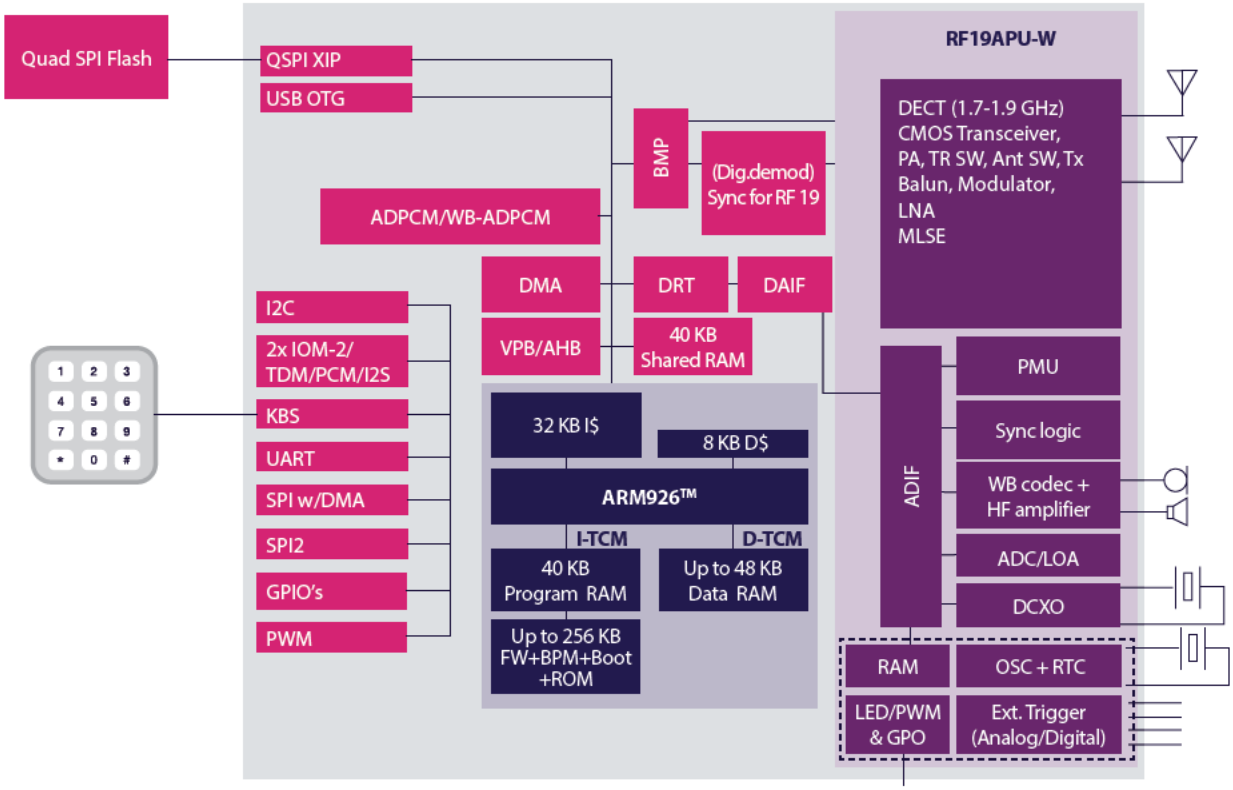
DHX91 Block Diagram



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