AMT-303/AGW-300　USN TAG / Gateway (Router)

Architecture:

USN TAG/Gateway is the component device of a wireless materials management system that using a low-power, low-cost RF solution.

RF solution uses CC2530 that support IEEE802.15.4 and ZigBee.

It can co-existence with Bluetooth, WLAN and other 2.4GHz digital-modulated devices.

Features

• RF/Layout

o 2.4-GHz IEEE 802.15.4 Compliant RF Transceiver

o Excellent Receiver Sensitivity and Robustness to Interference

o Very Few External Components

o Only a Single Crystal Needed for Asynchronous Networks

o 6-mm × 6-mm QFN40 Package

o Suitable for Systems Targeting Compliance With Worldwide Radio-

Frequency Regulations: ETSI EN 300 328 and EN 300 440 (Europe),

FCC CFR47 Part 15 (US) and ARIB STD-T-66 (Japan)

• Low Power

o Active-Mode RX (CPU Idle): 24 mA

o Active Mode TX at 1 dBm (CPU Idle): 29 mA

o Power Mode 1 (4 μs Wake-Up): 0.2 mA

o Power Mode 2 (Sleep Timer Running): 1 μA

o Power Mode 3 (External Interrupts): 0.4 μA

o Wide Supply-Voltage Range (2 V–3.6 V)

• Microcontroller

o High-Performance and Low-Power 8051 Microcontroller Core

With Code Prefetch

o 32-, 64-, 128-, or 256-KB In-System-Programmable Flash

o 8-KB RAM With Retention in All Power Modes

o Hardware Debug Support

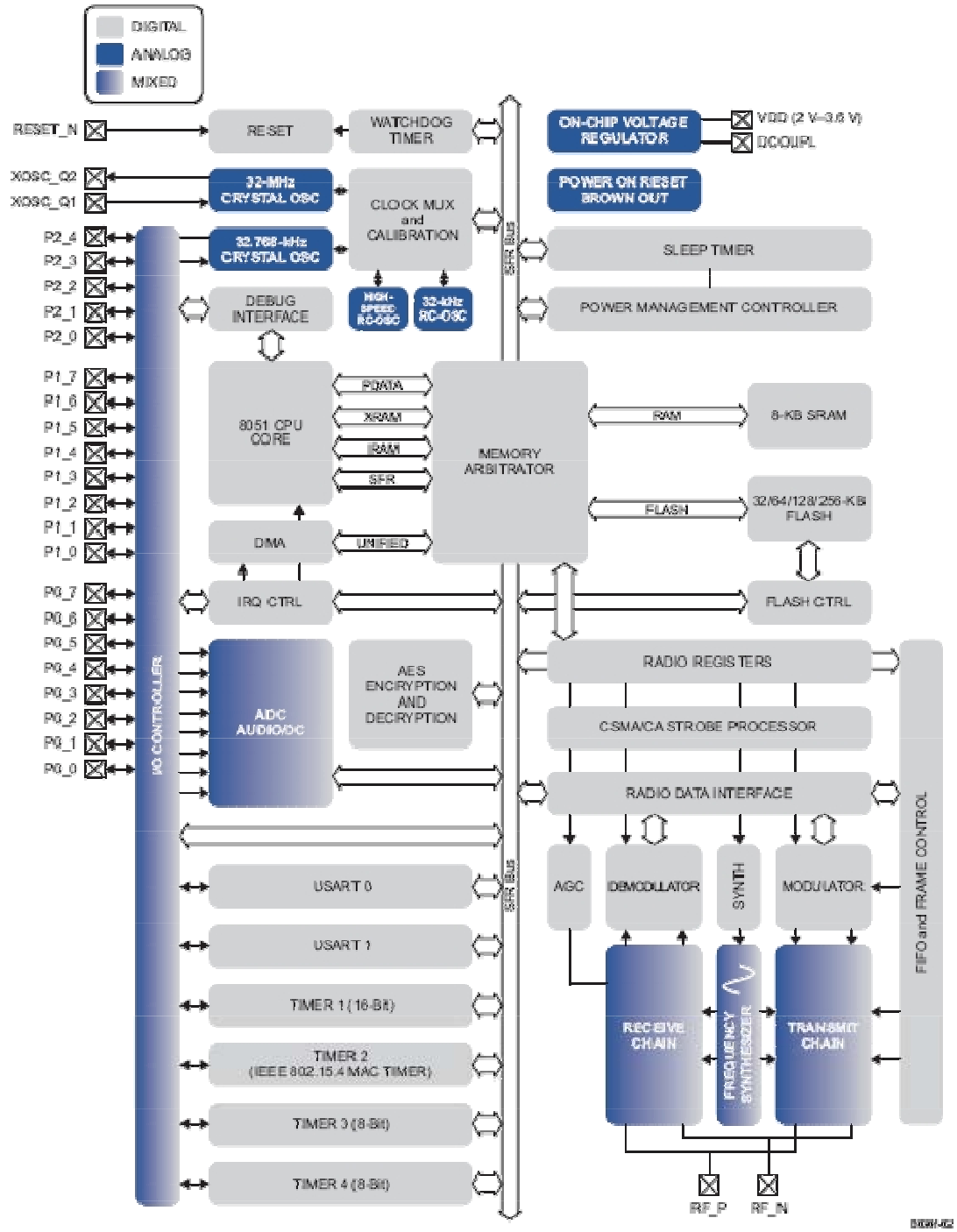


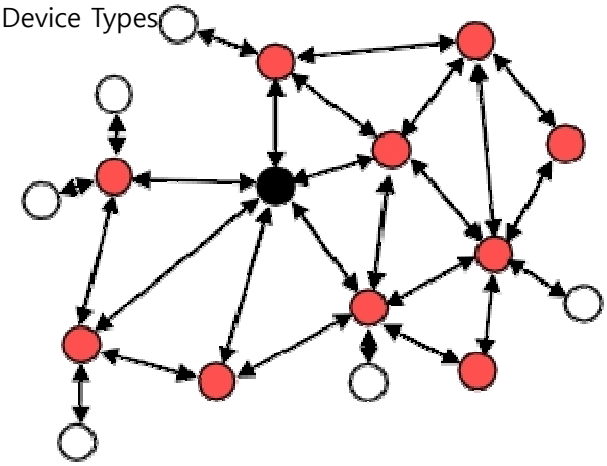
Figure 7. CC2530 Block Diagram

The CC2530 is a true system-on-chip (SoC) solution for IEEE 802.15.4, Zigbee and RF4CE applications. It enables robust network nodes to be built with very low total bill-of-material costs. The CC2530 combines the excellent performance of a leading RF transceiver with an industry-standard enhanced 8051 MCU, in-system programmable flash memory, 8-KB RAM, and many other powerful features. The CC2530 comes in four different flash versions: CC2530F32/64/128/256, with 32/64/128/256 KB of flash memory, respectively. The CC2530 has various operating modes, making it highly suited for systems where ultralow power consumption is required. Short transition times between operating modes further ensure low energy consumption.

ZigBee

A ZigBee network is a multi-hop network with battery-powered devices. This means that two devices that wish to exchange data in a ZigBee network may have to depend on other intermediate devices to be able to successfully do so. Because of this cooperative nature of the network, proper functioning requires that each device (i) perform specific networking functions and (ii) configure certain parameters to specific values. The set of networking functions that a device performs determines the role of the device in the network and is called a device type. The set of parameters that need to be configured to specific values, along with those values, is called a stack profile.

* Device Types



There are three logical device types in a ZigBee network – (i) Coordinator (ii) Router and (iii) End-device. A ZigBee network consists of a Coordinator node and multiple Router and End-device nodes. Note that the device type does not in any way restrict the type of application that may run on the particular device.

An example network is shown in the diagram above, with the ZigBee coordinator (in black), the

routers (in red) and the end devices (white).

* Coordinator

This is the device that "starts" a ZigBee network. It is the first device on the network. The coordinator node scnas the RF environment for existing networks, chooses a channel and a network identifier (also called PAN ID) and then starts the network.

The coordinator node can also be used, optionally, to assist in setting up security and application-level bindings in the network.

Note that the role of the Coordinator is mainly related to starting up and configuring the network. Once that is accomplished, the Coordinator behaves like a Router node (or may even go away). The continued operation of the network does not depend on the presence of the Coordinator due to the distributed nature of the ZigBee network.

* Router

A Router performs functions for (i) allowing other devices to join the network (ii) multi-hop routing (iii) assisting in communication for its child battery-powered end devices.

In general, Routers are expected to be active all the time and thus have to be mains-powered.

* End-device

An end-device has no specific responsibility for maintaining the network infrastructure, so it can sleep and wake up as it chooses. Thus it can be a battery-powered node.

Generally, the memory requirements (especially RAM requirements) are lower for an end-device.