

# VE209S Mesh Controller Family

## Overview

VE209S is a high performance Mesh Controller, which together with a Semtech SX1211 or SX1231 transceiver, serves as the main building block of a VEmesh unit - Gateway or Node.

VEmesh units are the elements of a wireless network, designed and optimized for mesh topology. VEmesh provides highly reliable bi-directional communication and the best-in-class range and coverage for distributed monitoring and data collection of smart lighting, smart metering, sensor systems and a wide range of remote control applications.

A typical wireless mesh network utilizing VEmesh contains one gateway and a number of nodes. In addition to their own activity, all VEmesh nodes act as relays - retransmitting other units' data in order to create a modular solution with a practically unlimited number of nodes, hops and coverage area.

VE209S based networks are targeted and optimized for Low Power, Battery-operated Systems, which operate in the ISM and SRD sub-Giga frequency bands. They use FHSS (frequency hopping), notable for its resilience to interference.

The VE209S paired with the SX1211 offers an ultra-low power, high-performance mesh chipset and the VE209S paired with the SX1231 offers an ultra-high transmission range solution.

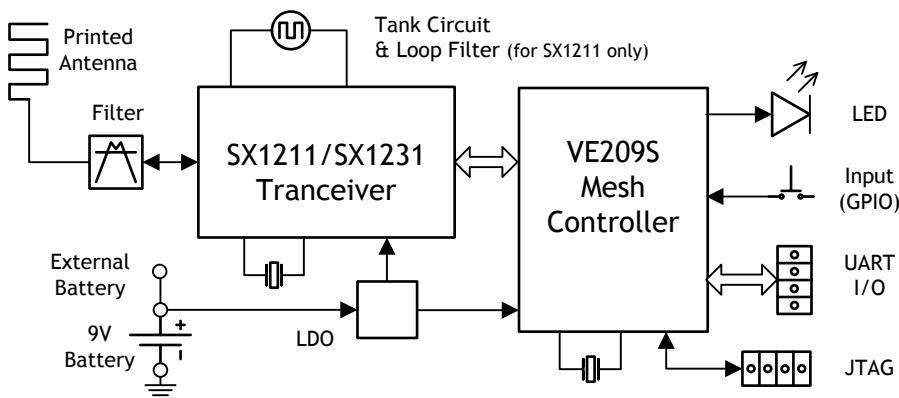


Figure 1 - Block Diagram of a typical VEmesh unit (Gateway or Node) using VE209S and SX1211/SX1231

## Description

The VE209S family of high performance Mesh Controllers has the necessary internal building blocks for performing all the interfaces and network handling; together with a Semtech SX12xx transceiver chip, it forms the core of a VEmesh unit. The flexibility of VE209S Mesh Controllers enables them to connect directly to a large variety of I/O interfaces, ranging from dry contact to RS232, MODBUS to TCP/IP1.

The VE209S Mesh Controller firmware efficiently performs all Mesh communication tasks and radio control on an 8MHz, 16-bit RISC CPU microcontroller, with 4KB Flash Memory, 256B RAM flash, a 16 bit timer, a brownout detector (BOD), a digitally controlled oscillator (DCO) and I/O ports.

The ports of VE209S serve as I/O interface (Sync LED, UART, GPIO, etc.) and for connection to the transceiver, in addition to other auxiliary functions. Some of the I/O ports are dual-purpose, serving different functions at different timing (i.e. the JTAG pins). The functionality of the I/O interface pins is customizable to various interfaces - standard or proprietary - and can be optimized to various network modes of operation.

The standard controller firmware can be used for a variety of applications, as exemplified in Figure 1 above.

Operating on a regulated 2.2 to 3.6 VDC, the VE209S typical average battery-operation power consumption is 20  $\mu$ A, dropping to 2  $\mu$ A in idle mode. The device is offered in several packages and in two temperature ranges.

# VE209S Mesh Controller Family – Brief Product Sheet

## Block Diagram

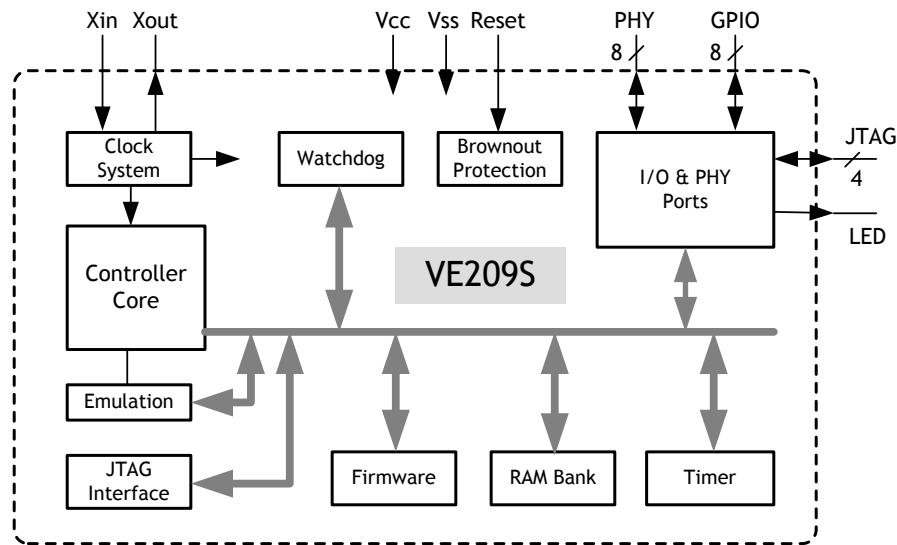


Figure 2 - Internal Block Diagram

## Features

- Designed for high-performance, extended range Mesh wireless networks
- Very low power consumption
- Frequency Hopping (FHSS) for high resilience to interference
- Versions available to comply with regulations in Europe, US and other countries
  - implements LBT and AFA
  - for current country availability, please contact Virtual Extension
- Large range of I/O interfaces and protocols
- Designed for easy customization to various interface and network modes of operation

- Built-in single LED indicator for simple unit deployment

## Specifications

- Frequency range
  - 863 ÷ 870 MHz or
  - 902 ÷ 928 MHz or
  - 950.8 ÷ 955.8 MHz
- FHSS: 64 frequencies
  - 47 frequencies for Europe
- Serial Data Rate:
  - up to 300 Kbps
- 14 I/O Ports:
  - Tx/Rx Control & Data
  - Host interface
  - General Purpose

- I/O interfaces & protocols
  - UART - transparent & buffered
  - RS485
  - I<sup>2</sup>C
  - DALI (Digital Addressable Lighting Interface)
  - MODBUS
  - M-Bus
  - Custom interfaces & protocols
- Voltage/Ripple & Noise/Peak current: 2.2 to 3.6 VDC/±15 mV/10 mA
- Power consumption typical/idle: 20 µA / 2 µA

## Applications

VEmesh networks based on VE209S are ideal when high performance, robustness, and easy deployment are required. With their low receiving, stand-by, and transmitting power consumption, VEmesh networks are also an excellent choice when battery life is critical. These networks are best fit for applications such as Smart and Emergency Lighting, Utilities Smart Metering and AMR/AMI, Building Automation, Plant Monitoring and Maintenance, Agriculture, Energy and Environment, Medical applications, Vending Machines, Security & Surveillance.

## Ordering information

VE209S is available in several variants, according to the country and the network, in 20/24-Pin packages and in two temperature ranges. To order the part, send your inquiry by email to [sales@virtual-extension.com](mailto:sales@virtual-extension.com) or contact Virtual Extension as detailed below. An evaluation kit including a Gateway and Nodes is available for testing and evaluation.

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