AR4100

Single-stream 802.11n SIP
for the Internet of Everything

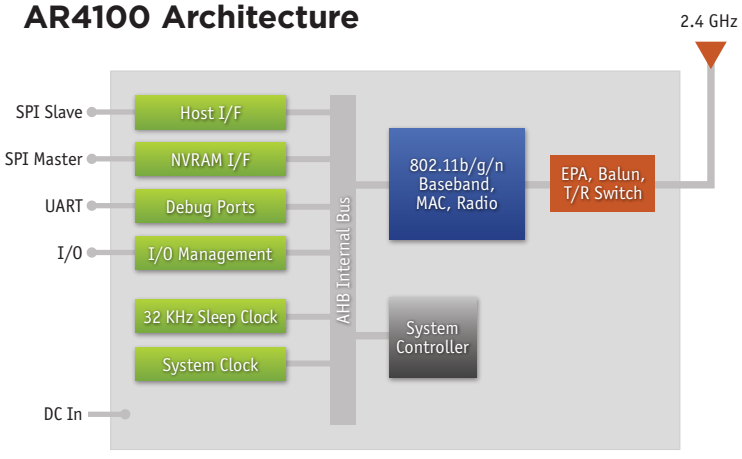
Qualcomm ATHEROS

Solution Highlights

The AR4100 is a single-stream (1x1) IEEE 802.11n system-in-package (SIP) featuring:

- Low energy
  - Power saving modes as low as 5 µA
  - Fast wake-up times as low as 2.2 ms
  - Support for Quad SPI flash for faster wake times
- Low system resource requirements
  - Small, simple host driver enables low resource microcontroller (MCU) hosts (25K Flash and 8K RAM)
- Simple, low-cost wireless system integration
  - LGA package simplifies 2- or 4-layer PCB design
  - Near zero RBOM
  - Integrated RF front end, RF shield and clocks
  - Direct connect to a 50-ohm antenna
- Qualcomm Atheros industry leading 802.11n Wi-Fi®
  - Integrated high-power, high-efficiency power amplifier
  - On-SIP Wi-Fi protected setup (WPS 2.0)
- Standard SPI interface for connecting to MCUs
- FCC Modular SIP Certifcation

AR4100 Architecture



Product Overview

The AR4100 is a small form-factor, single-stream, 802.11n Wi-Fi system-in-package (SIP) solution. Developed to support applications hosted by low-resource MCUs that send infrequent data packets over the network. Typically, these 802.11 applications will place a higher priority on system cost, power consumption, ease of use, and fast wake-up times as compared to high throughput. The AR4100 integrates all Wi-Fi functionality into a low-profile, 8.3 mm x 9.2 mm LGA package that can be easily mounted via low-cost PCB manufacturing flows. The device requires only a few external bypass capacitors and a connection to an antenna for a board level design.

The AR4100 employs a low power consumption embedded architecture. It has been optimized for client applications in the home, enterprise, smart grid and home automation and control that have lower data rates and transmit or receive data on an infrequent basis. The AR4100 features standby current consumption as low as 5 µA. Additional optimizations, including a reduced host driver footprint, allow easy integration with low-cost microcontrollers.

Qualcomm Atheros Align®

The AR4100 leverages Align technology, Qualcomm Atheros' advanced version of the single-stream 802.11n specification, to enable long range at the lowest possible power consumption. Fast wake-up transitions, coupled with high-speed transmission, allow the system to maximize sleep time to reduce energy consumption. The underlying Align technology in the AR4100 is market-proven, driving leading edge connectivity in a host of high-volume applications, while providing industry-leading low power. Align solutions are backwards compatible to existing 802.11b/g infrastructures and forward compatible with higher-performance, multi-stream, MIMO–based 802.11n infrastructures. Finally, the fast transmit rates of Align technology ensure less network congestion in deployments with a large number of 802.11 clients.

align®
Qualcomm Atheros

AR4100

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AR4100 Radio

- 2.4 GHz
- Integrated CMOS Efficient Power Amplifier (EPA™), LNA
- Adaptive radio biasing for low-power or high-performance modes
- Industry-leading receive sensitivity
- No external EEPROM required for RF calibration
- Advanced 802.11n features improve range
  - STBC (Rx)
  - LDPC (Tx)
- Auto-calibration

AR4100 MAC/Baseband/Processor

- IEEE 802.11n
- Integrated RISC processor
- Hardware accelerated security
- Pushbutton configuration security (WPS 2.0)

Currently Supported Development Environment

- Freescale Tower Development Platform
- ColdFire MCF52259 or Kinetis MCU with greater than 256K NVM
- Freescale MQX™ version 3.6.2 and MQX 3.7
- Freescale CodeWarrior® tools suite v7.2 for MQX3.6.2
- Freescale CodeWarrior® tool suite v10.1 with MQX3.7
- IAR Systems Embedded Workbench® v6.20 for MQX3.6.2

AR4100 Specifications

On-chip functionality	Single-chip MAC/BB/RF/PA/LNA
Frequency Band	2.4 GHz
Network Standard	802.11b, 802.11g, 802.11n (1-stream)
Modulation Modes	CCK and OFDM with BPSK, QPSK, 16 QAM, 64 QAM
Hardware Encryption	WEP, WPA/WPA2 (AES and TKIP), SPI Communications Interface
Physical Specifications	8.3 mm x 9.2 mm LGA package

Qualcomm Atheros is a wholly owned subsidiary of Qualcomm and a leading provider of wireless and wired technologies for the mobile, networking, computing and consumer electronics markets. We're focused on inventing technologies that connect and empower people in ways that are elegant and accessible to all.

Our broad connectivity portfolio allows us to offer our global customer base high-performance, end-to-end solutions, featuring Wi-Fi®, GPS, Bluetooth®, FM, Ethernet, HomePlug™ Powerline and PON technologies. By leveraging substantial expertise in RF, signal processing, software and networking we can deliver highly-integrated, low-power, system-level solutions that enable developers to create high-performance, differentiated products.

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