ATHEROS®
COMMUNICATIONS

AR5001X+

AR5001X+ Multimode WLAN Solution

With support for IEEE 802.11a, the 802.11g draft standard and the 802.11b legacy standard, the Atheros AR5001X+ Multimode WLAN chip set supports the important standards for both current and future wireless networks. System developers can use the AR5001X+ to create products that work with any of these networks and allow end users to choose whatever network they wish, bypassing debates about standards. Use of the Advanced Encryption Standard (AES) also eliminates security concerns.

Since 802.11a and 802.11b/g networks occupy different frequency bands, they can be deployed alongside one another. This Multimode Solution therefore offers an easy upgrade path for expanding available bandwidth. Building upon the inherently high quality of 802.11a operation in the interference-free 5-GHz band, this Multimode Solution opens the way for wide-scale deployment of wireless networks.

Highlights

- Support for IEEE 802.11a, 802.11b and the draft 802.11g standards

- Uses CMOS technology exclusively, minimizing power consumption and cost while maximizing reliability

- Highly integrated 3-chip set

- 5-GHz Radio-on-a-Chip

- 2.4-GHz Radio-on-a-Chip

- Multiprotocol MAC/baseband processor that supports both RoCs

- Second-generation 802.11a technology

- Quality of Service support (QoS)

- 108-Mbps Turbo Mode

- Dynamic Frequency Selection/Transmit Power Control (DFS/TPC) for international operation

- Comprehensive security solutions including full line speed support for Advanced Encryption Standard (AES), Temporal Key Integrity Protocal (TKIP) and Wireless Equivalent Privacy (WEP); support for Wi-Fi Protected Access (WPA), LEAP (EAP Cisco Wireless), and draft 802.11i

- Extended 802.11a tuning range: 4.900 - 5.580 GHz

- 802.11 b/g tuning range: 2.400-2.500 GHz

- Support for draft IEEE 802.11e, f and h standards

- Enhanced performance, transmission range and reliability

Chipset overview

The AR5001X+ Multimode Solution comprises three low-power chips, each of which rely exclusively on standard-process CMOS. As a result, the chip set delivers reliable, cost-effective connectivity.

The chipset includes:

AR5111 5-GHz Radio-on-a-Chip (RoC)

- Dynamic IF Dual Conversion architecture provides super-heterodyne performance at Zero IF prices

- Support for IEEE 802.11a standard

- Integrated second-generation power amplifier

AR2111 2.4-GHz Radio-on-a-Chip (RoC)

AR5111 5-GHz Radio-on-a-Chip (RoC)

AR5212 Multiprotocol MAC/baseband processor
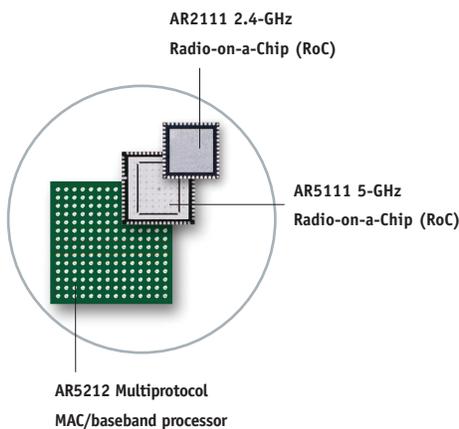
AR5001X+ WLAN System Architecture
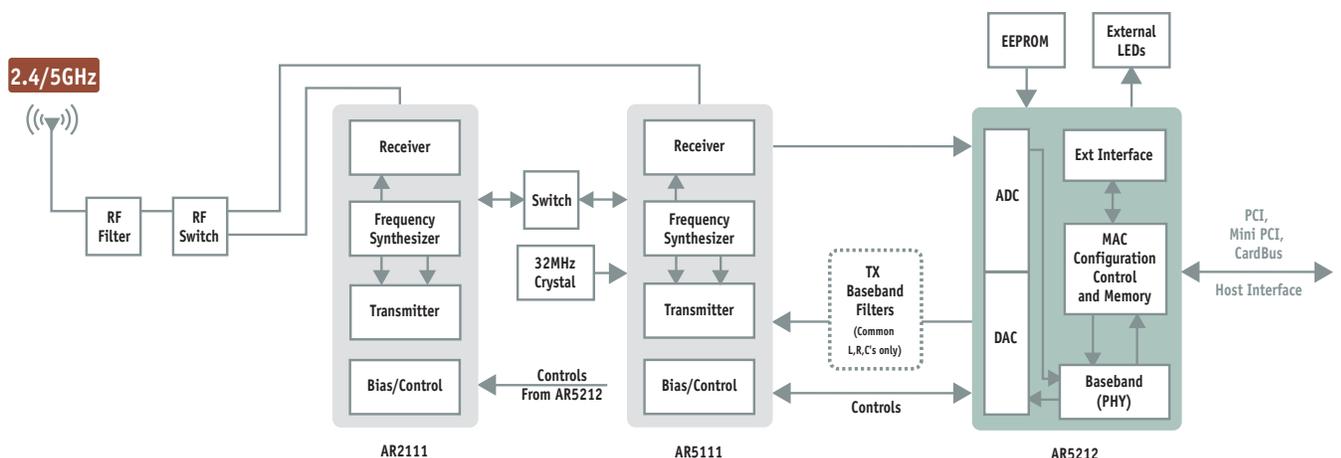
(PA) and low-noise amplifier (LNA)

- External PA and/or LNA can be used for special applications
- Enhancements to the transmit and receive chains
- Eliminates all IF filters and most RF filters; no external voltage-controlled oscillators (VCOs) or surface acoustic wave (SAW) filters needed

AR5212 Multiprotocol MAC/baseband processor

- Supports both 5 GHz and 2.4 GHz RoCs
- Smart Select™ technology automatically chooses the RF technology (a/g/b), data rate, error-correction mode, radio channel, power-management method, and security technology best suited to any situation
- PCI 2.3 and PC Card 7.1 host interfaces with DMA support
- Integrated analog-to-digital and digital-to-analog converters

- Serial EEPROM, LEDs, GPIOs peripheral interfaces
- Low-power operational and sleep modes

AR2111 2.4-GHz Radio-on-a-Chip (RoC)

- Support for 802.11b and 802.11g draft standard
- Operates from 2.400 to 2.500 GHz
- Advanced wideband Receiver with Best Path Sequencer for better range and multipath resistance than conventional equalizer-based designs

Applications

- CardBus PC cards
- PCI and Mini PCI boards
- SOHO/residential gateways
- Set-top box and advanced TV products that share video and data throughout the home

Second-generation 802.11a

At the heart of the AR5001X+ Multimode Solution is Atheros second-generation 802.11a technology. This technology includes the second-generation implementation of the Orthogonal Frequency Division Multiplexing (OFDM) modulation scheme with 15 advances in OFDM radio design. As the modulation scheme for both 802.11a and the draft 802.11g standards, OFDM is key to high-performance wireless networking.

OFDM mitigates multipath intersymbol interference at high data rates by simultaneously transmitting multiple subcarriers on orthogonal frequency channels. Each subcarrier is modulated at a low symbol rate. Because this approach is tolerant of many common channel impairments, OFDM improves range and reliability, making it the ideal choice for supporting multiple high-bandwidth tasks in real time.

AR5001X+ Features Include

- **Full hardware support for Advanced Encryption Standard (AES). Temporal Key Integrity Protocol (TKIP) and WEP. Security – at full line-speed with no performance degradation.**

- **Quality of Service (QoS) for real time video, audio voice.**

- **Dynamic Frequency Selection (DFS) and Transmit Power Control (TPC) for international use.**

- **Up to 108-Mbps Atheros Turbo Mode™ in addition to standard rates of 6,9,12,18, 24,48, 54-Mbp for 802.11a/g, and 1,2,5.5 11-Mbps for 802.11b**

- **Smart Select™ optimization of data rate, error-correction mode, radio channel, power-management, and security.**

- **Superior link robustness through proprietary channel estimation and error correction, as well as low noise, high linearity, RF front end and analog baseband circuits.**

- **Extended 4.900 to 5.580-GHz and 2.400 to 2.500-GHz tuning ranges.**

AR5001X+ Chipset Specifications

Frequency Band	4.900 to 5.850-GHz and 2.400 to 2.500-GHz
Network Standard	802.11a, 802.11g draft, 802.11b
Network Architectures	Ad hoc, Infrastructure
Modulation Technology	OFDM, CCK, DSSS
Modulation Techniques	BPSK, QPSK, 16 QAM, 64 QAM
FEC Coding Rates	1/2, 2/3, 3/4
Security	
Encryption	AES, TKIP, WEP
Authentication	802.1x
Quality of Service	802.11e draft
Media Access Technique	CSMA/CA
Peripheral Interface	EEPROM, GPIOs, LEDs
Host Interface	PCI, Mini PCI, CardBus
Supported Data Rates	
IEEE 802.11a, 802.11g, 802.11b Standard Mode	1 - 54 Mbps
Atheros Turbo Mode	12 - 108 Mbps

Chip Specifications	AR2111	AR5212	AR5111
Operating Voltage	2.5V +/- 5%	2.5V +10% - 5%	2.5V +/- 5%
	3.3V +/- 10%	3.3V +/- 10%	3.3V +/- 10%
Package Dimensions	7mm x 7mm	15mm x 15mm	9mm x 9mm
Packaging	48 LPCC	196 PBGA	64 LPCC

For more information contact Atheros sales:

Atheros Communications, Inc.
529 Almanor Avenue
Sunnyvale, CA 94085-3512

t: 408-773-5200
f: 408-773-9940
sales@atheros.com
www.atheros.com

Atheros Communications International KK-Japan
t: 03.5282.4111
f: 03.5282.4116
sales_asia@atheros.com

Atheros Communications International LLC-Hong Kong
t: 852.82061131
f: 852.82061301
sales_asia@atheros.com

Atheros Communications International LLC-Taiwan
t: 886.2.2647.1793
f: 886.2.2643.02941
sales_asia@atheros.com