5 GHz performance

Atheros ROCm™ Platform
Radio-On-Chip for Mobile (ROCm) Products

Introducing the Atheros ROCm platform of high-performance wireless solutions for mobile and embedded devices. The Atheros ROCm platform gives customers unsurpassed ability to:

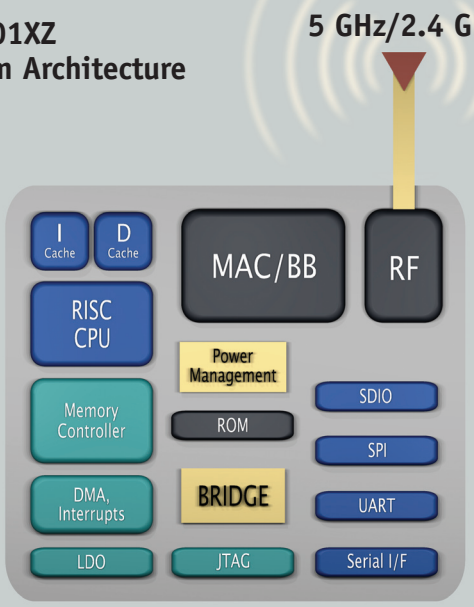
- Build the most power efficient devices
- Design for smallest form factor applications
- Achieve the most cost effective designs
  - Greater integration of functionality
  - Low-cost chip solution
- Deliver Atheros-class performance in a wide array of mobile devices

AR6001XZ Technology Overview

The AR6001XZ allows direct connection to cellular baseband and application processors via SDIO, SPI, and memory-mapped parallel interfaces. Its on-board processing and storage capabilities allow it to be integrated with the host platform with minimal development upfront and minimal loading during runtime. With its high degree of on-chip integration, it requires minimal external circuitry, and the entire solution, including front-end module, is designed to occupy minimal PCB area.

Sophisticated system-level features include fast sleep/wake context switching for energy-efficient VoIP, adaptive radio biasing for low-power operation, and spur cancellation and radio co-existence features for cellular/Bluetooth/802.11 interference mitigation. The AR6001XZ is designed from the ground up to be a robust, space- and energy-efficient 802.11 solution to bring true broadband access capability to a range of mobile devices.

AR6001XZ System Architecture



AR6001XZ

AR6001XZ

Embedded 802.11a/b/g Solution for Mobile and Battery-Operated Devices

AR6001XZ
Low power and compact footprint for versatile wireless VoIP and data

AR6001XZ Chip Features

- SDIO 1.1, SPI, UART, local bus parallel memory-mapped interfaces
- Integrated RISC processor
- External serial and parallel memory interfaces
- Integrated MAC/baseband processor and radio
- On-chip low-dropout linear regulator
- Fractional-N synthesizer for radio agility and external reference frequency scaling
- WEP, TKIP, and AES engines for line-speed encryption support
- Advanced Quality of Service
- Digital audio I^2S output for wireless speaker support

Solution Features

- Leading Edge APSD support for energy-efficient VoIP (sleep between voice packets)
- Adaptive radio biasing for low-power or high-performance modes
- In-band spur cancellation algorithms for interference immunity
- Bluetooth co-existence interface for time-shared transmission
- JumpStart for Wireless™ secure configuration tool

Summary of Benefits

- Universal client 802.11a/b/g capability for mobile and embedded devices
- Low power consumption with adaptive radio biasing for sustained power savings
- Self-contained, modular design for minimal host loading
- High integration level for compact and low-cost designs
- System-level enhancements for energy-efficient VoIP, interference immunity, and Bluetooth co-existence

AR6001XZ Reference Design

The AR6001XZ integrates the RF transceiver, baseband, MAC, central processing and peripheral control functions. A separate RF front-end module integrates the power amplifier, low-noise amplifier, and transmit/receive switch.

For the BGA package, the total solution area is less than 150 mm^2.
For the Flip-chip package, the total solution area is less than 100 mm^2.
The height of all solutions is less than 1.4 mm.

Applications

- Dual-mode cellular phones
- Smartphones with video and MP3 playback capability
- 802.11 Terminals
  - VoIP handsets for use with services such as Skype,™ Vonage™, etc.
  - Web clients with text, VoIP, and video messaging capability
- Media devices such as MP3 music or MP4 video players
- Mobile gaming platforms with peer-to-peer network capability
- Control and automation in robotics, appliances, white goods, toys, etc.
- Digital still cameras and camcorders

AR6001XZ Software Package

The software package consists of an NDIS equivalent interface, WLAN firmware, and control module running on the Host. NDIS[1] equivalent interface for seamless integration and operation of the 11a/g or 11g station.

WLAN Firmware

- Host/Target communication layer for basic packetized message exchange between the host and AR6001XZ
- eCOS BSP – Basic Kernel
  - Atheros Radio Test module
  - Basic Boot Module Interface
  - ROM based Firmware
  - Firmware upgradeable via external Flash
- Wireless Module Interface (WMI) – High-level API to allow setup and configuration of the networks from the host
  - WLAN mode configuration (Infrastructure or Ad-Hoc)
  - Regulatory control
  - Power consumption vs. performance oriented modes
  - Listen Interval
- Network scanning, discovery, roaming
- MLME protocol support

Host connection, industry-standard security management[2] module:

- Configuration of scanning and roaming parameters
- TSPEC(s) for special (QoS or low-energy) handling of tagged data
- Control of security policy and provisioning of encryption keys

1 NDIS - Microsoft's Network Driver Interface Specification

2 Windows ZeroConfig equivalent functionality with security supplicant for key management

AR6001XZ Specifications

Frequency Band	5 GHz, 2.4 GHz
Network Standard	802.11a, 802.11b, 802.11g
Modulation Modes	OFDM with BPSK, QPSK, 16 QAM, 64 QAM, CCK
Hardware Security	AES, TKIP, WEP, WPA, WPA2, 802.11i
Quality of Service	Wi-Fi Multimedia, 802.11e EDCF
Media Access Technique	CSMA/CA
Data Path Interfaces	SDIO 1.1, SPI, 8- or 16-bit parallel memory mapped
Control Interfaces	16550-style UART, EJTAG, GPIO, I^2S
Memory Interfaces	Serial FLASH, Parallel FLASH, SRAM
Supported Data Rates	
IEEE 802.11a	6 to 54 Mbps
IEEE 802.11b	1 to 11 Mbps
IEEE 802.11g	6 to 54 Mbps
Physical Specifications	
Package Type	BGA 10 mm x 10 mm
For Modular Designs	
Package Type	Flip-chip Bare Die
Related ICs	AR6001G, AR6001GZ AR6001X, AR6001XZ

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