



## 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

### AR6001X Technology Overview

The AR6001X 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 AR6001X 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.

# AR6001X

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



#### AR6001X

Low power and compact footprint for versatile wireless VoIP and data with embedded FLASH

### AR6001X 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<sup>2</sup>S output for wireless speaker support
- Embedded FLASH

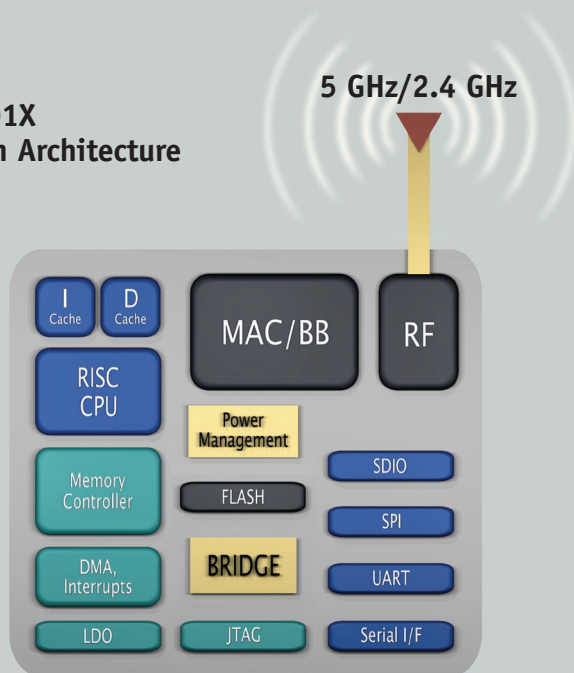
### Solution Features

- Leading Edge APSD support for energy-efficient VoIP (sleep between voice packets)
- Fast channel scanning and changing for handset-assisted handover
- 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
- Supports Cisco Compatible Extensions version 4.0

### Summary of Benefits

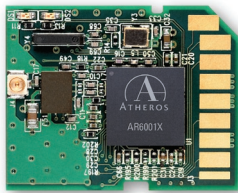
- Universal client 802.11a/b/g capability for mobile and embedded devices
- Low power consumption with adaptive radio biasing for sustained power savings
- Self-contained, modular design for minimal host loading
- High integration level for compact and low-cost designs
- System-level enhancements for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

### AR6001X System Architecture



AR6001X

Actual size  
comparison



## AR6001X Reference Design

The AR6001X 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<sup>2</sup>. 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 robots, appliances, white goods, toys, etc.
- Digital still cameras and camcorders

## AR6001X Software Package

The software package consists of an NDIS equivalent interface, WLAN firmware, and Control module running on the Host. NDIS<sup>1</sup> 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 AR6001X
- eCOS BSP – Basic Kernel
  - Atheros Radio Test module
  - Firmware upgrade
  - Basic Boot Module Interface
- 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<sup>2</sup> 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

<sup>1</sup> NDIS - Microsoft's Network Driver Interface Specification

<sup>2</sup> Windows ZeroConfig equivalent functionality with security supplicant for key management

## AR6001X 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          |
| Internal FLASH                 | 512 KB                                             |
| 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 <sup>2</sup> S    |
| Memory Interfaces              | Serial FLASH, Parallel FLASH, SRAM                 |
| <b>Supported Data Rates</b>    |                                                    |
| IEEE 802.11a                   | 6 to 54 Mbps                                       |
| IEEE 802.11b                   | 1 to 11 Mbps                                       |
| IEEE 802.11g                   | 6 to 54 Mbps                                       |
| <b>Physical Specifications</b> |                                                    |
| Package Dimensions             | BGA 10mm x 10mm                                    |
| Related ICs                    | AR6001G, AR6001GZ<br>AR6001X, AR6001XZ             |

Contact your local Atheros representative and ask about other technology solutions from Atheros:

Atheros Communications, Inc.  
t +1 408.773.5200 f +1 408.773.9940

Atheros Communications KK-Japan  
t +81 3.5501.4100 f +81 3.5501.4129

Atheros Hong Kong Limited  
t +852 8206.1131 f +852 8206.1301

Atheros Communications International, LLC-Taiwan  
t +886 2.8751.6385 f +886 2.8751.6397

