Introducing the Atheros AR5000 Wireless LAN Solution

By reengineering and optimizing conventional radio architecture, Atheros has developed a breakthrough in next-generation wireless local area network (WLAN) semiconductor technology. The company has made possible the world's first complete “Radio-on-a-Chip” (RoC) at 5-GHz using standard-process CMOS. The resulting AR5000 chipset is:

• A cost-effective 5-GHz wireless LAN solution, with speeds up to 72 Mbps.
• IEEE 802.11a standard compliant up to 54 Mbps.
• Highly integrated, offering an end-to-end, two-chip design.
• Built entirely using mainstream, standard-process CMOS.
• Extremely energy efficient, incorporating a low-power design.

The Atheros AR5000 series chipset enables standards-based next-generation wireless LAN applications with dramatically improved performance and power efficiency, as well as significantly reduced cost and complexity. This makes AR5000 solutions ideal for wireless networking in enterprises, homes and public area network marketplaces such as airports and hotels.

Gaining the Benefits of the IEEE 802.11a, 5-GHz Wireless Standard

The highly integrated Atheros AR5000 chipset in standard-process CMOS has driven the industry to the next generation of wireless LANs— with all the benefits of 802.11a, 5-GHz wireless networking:

• Unlicensed 5-GHz spectrum is available throughout much of the world.
• The broad spectrum allocation enables higher data throughput than 2.4-GHz.
• Regulations limit interference from applications that require higher power levels, such as wireless local loop.
• The Orthogonal Frequency Division Multiplexing (OFDM) modulation with multi-path tolerance provides outstanding range and reliability.

Additionally, as a 5-GHz solution, the Atheros AR5000 chipset is free of interference from microwave ovens, 2.4-GHz cordless phones, and other technologies such as Bluetooth and HomeRF which compete for the 2.4-GHz Industrial, Scientific and Medical (ISM) frequency band.

The Atheros AR5000 solution is ideal for WLAN applications in both homes and offices.
Two-Chip Atheros AR5000 Solution: Features Summary

- Next generation wireless LAN technology using mainstream, standard-process CMOS
  - CMOS “Radio-on-a-Chip” (RoC) technology incorporates complete radio on a single chip
  - CMOS digital chip includes IEEE 802.11a Media Access Control (MAC) layer

- Compliant with the IEEE 802.11a, 5-GHz industry standard up to 54 Mbps
- Enhanced “turbo mode” for greater range and speeds up to 72 Mbps
- Complete chipset solution for IEEE 802.11a, 5-GHz wireless LAN Station (STA) and Access Point (AP) applications
- Increased range and reliability with IEEE 802.11a OFDM modulation

- Low-power design
- Proven customer designs and developer’s kit that reduce development risk and time
- Similar price points to lower-speed IEEE 802.11b, 2.4-GHz technology

Higher Speeds for Demanding Applications

The Atheros AR5000 solution supports speeds up to 54 Mbps, compliant with the IEEE 802.11a, 5-GHz wireless standard. In addition, using its enhanced “turbo mode,” the AR5000 chipset provides an option for 72 Mbps, and even greater range than the standard 54 Mbps mode.

With these higher data rate capabilities, the Atheros AR5000 chipset enables applications that slower networks simply cannot support. For example, HDTV alone requires a minimum of 20 Mbps. At speeds up to 72 Mbps, the AR5000 chipset can support high-bandwidth multimedia applications, such as HDTV and digital video, in addition to normal data transfers.

Low Component Count in CMOS for Reduced Cost and Complexity

Atheros has achieved an unprecedented level of integration for high-speed wireless LANs. The highly integrated design of the Atheros AR5000 chipset eliminates the need for external Media Access Control (MAC) chip, voltage controlled oscillators (VCOs), surface acoustic wave (SAW) filters, and power amplifiers. The low component count of the two-chip AR5000 solution significantly reduces product design time, manufacturing costs and board real estate. It also means a less complex design, improved reliability and smaller form factors.

Combined with the economy of standard-process CMOS technology, the low component count makes the Atheros AR5000 chipset an extremely cost-effective wireless LAN solution. In comparison, other solutions use expensive technologies such as silicon germanium (SiGe) and gallium arsenide (GaAs), and have higher-component counts that require extensive RF expertise to implement.

Improved Range and Reliability with OFDM Modulation

The Atheros AR5000 solution implements the OFDM modulation scheme specified by the IEEE 802.11a, 5-GHz standard. OFDM mitigates multipath and 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 it is more tolerant of common channel impairments, this advanced technology improves range and reliability, making it the perfect choice for wireless LAN applications that support multiple high-bandwidth tasks in real time.

Low-Power, Energy-Efficient Design for Longer Battery Life

Incorporating a low-power design, the Atheros AR5000 chipset is highly energy efficient. For example, compared with 2.4-GHz solutions, the AR5000 chipset uses approximately one-sixth the battery energy to transfer the same amount of data.

Developer’s Kit to Speed Implementation

The Atheros AR5000 solution includes a developer’s kit that can help shorten your development cycle and improve your time-to-market. For additional information on the developer’s kit, contact Atheros sales.

For more information contact Atheros sales: