AR1511 Technology Overview

The Atheros AR1511 is a high-performance GPS solution, consisting of the tiny CMOS AR1511 GPS IC teamed with the powerful ORION v3.0 multi-mode navigation software.

The AR1511 is a highly-integrated GPS receiver comprised of a single-conversion RF front-end and a GPS baseband processor combined on a single die. The L1 RF front-end includes an on-chip low noise amplifier (LNA), and a configurable phase-locked loop (PLL) that supports six (6) TCXO frequencies. The AR1511 provides 20-channel GPS operation and is based on an optimized 16-bit DSP with a compact, embedded real-time operating system (RTOS).

The ORION v3.0 Software is a powerful GPS navigation software package that supports hosted, autonomous, assisted-conventional, and single-fix Assisted-GPS (AGPS) modes while exceeding 3GPP AGPS performance requirements. ORION v3.0 also provides advanced acquisition algorithms to efficiently find weak GPS signals by utilizing the company's patent-pending third-generation search engine, enabling parallel searches and advanced tracking loops. These features allow ORION to quickly adapt to the dynamic conditions found in harsh urban canyons.

For standalone mode, customers can now utilize our new stacked flash packaging, allowing them to make the most efficient use of board space while minimizing their board integration efforts. In the host-based configuration, the ORION v3.0 software has been designed to minimize burden on the host processor.

With the AR1511, Atheros offers one of the highest performance, most cost-effective GPS solutions on the market today which also delivers on the size, power and cost requirements so important to our customers.

Atheros ROCm Platform

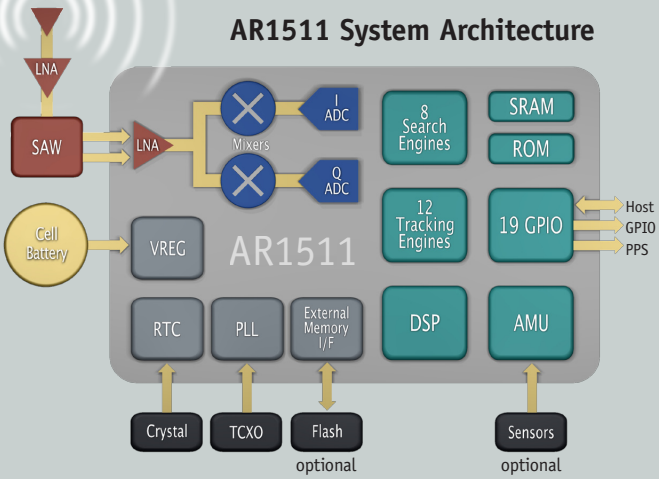
Radio-On-Chip for Mobile (ROCm) Products

The combination of ROCm wireless solutions for mobile WLAN, Bluetooth® and GPS, with Atheros' dominant position in the home, office and Metro Wi-Fi networking markets, enables a worldwide wireless ecosystem based on the company's technologies. Atheros-engineered ROCm technologies provide the most reliable wireless performance and connectivity anywhere you go.

The Atheros ROCm technologies give customers the unsurpassed ability to:

- Build the most power-efficient devices
- Design for the smallest form factor applications
- Achieve the most cost-effective designs
- Deliver Atheros-class performance in a wide array of mobile devices, all featuring a high level of design and integration ease.

AR1511 System Architecture



ROCm® ATHEROS

RADIO ON CHIP mobile

AR1511

Single-chip GPS receiver delivering state-of-the-art Assisted GPS

Market-Leading Efficiency and Performance

AR1511 Solution Highlights

- Single-chip GPS RF front-end and baseband processor implemented in a single monolithic die
- SUPL support allows assistance data to easily be transported across cellular networks
- Extended Ephemeris data enables speedy start up times even after the unit has been powered down for an extended time
- 20-channel GPS architecture, featuring eight independent search engines for simultaneous search and 12 tracking channels with power-down capability
- High sensitivity (-160 dBm) operation with autonomous and assisted support
- Supports autonomous, assisted conventional, and single-fix AGPS modes, while exceeding requirements for 3GPP
- WAAS, EGNOS, and MSAS capabilities correct positional errors caused by ionospheric disturbances and orbital errors – leading to a superior position solution both inland and offshore.
- Advanced power management architecture minimizes consumption through the individual power-down of multiple core and I/O islands
- Low-power RTC suitable for coin-cell battery backup
- Modular software architecture supports other host-based solutions, simplifying porting to any desired RTOS
- Install n Go™ software enables the industry's fastest and easiest integration of Windows CE® host-based GPS navigation software
- Patent-pending u-Map™ mapping assistance allows for an even higher level of navigation accuracy

AR1511 Portable Evaluation Kit (EVK)

Complete with software and an integrated AR1511 daughterboard, the AR1511 Evaluation Kit (EVK) is a full-featured GPS receiver that provides a conventional platform to evaluate the performance of the AR1511 and Orion software.

AR1511 Software Development Kit (SDK)

An ORION v3.0 Software Development Kit (SDK) is also available, providing developers with a compiling environment that allows the freedom to customize and add functional blocks to meet application specific requirements.

AR1511 Software Porting Kit (SPK)

Install n Go™ software is available for easy installation of the ORION hosted software on Windows Mobile® OS. For non-Windows Mobile® OS, Atheros' Software Porting Kit (SPK) supports porting to any desired RTOS. The SPK includes the ORION Host Abstraction Layer source code, ORION Library Files (support for unique compilers by Atheros), Windows® reference software solution, Linux 2.6 reference software solution (Eclipse sample project and modified kernel included), and documentation.

AR1511 Specifications

On-chip functionality	Single-chip BB/RF/LNA
Frequency Band	L1 Band, C/A Code
Standards	NMEA, 3GPP
Peripheral Interface	3 UARTS, Independent baud rate 4.8K – 230K
	2 High-Speed SPI ports
	GPIO ports for external I/O (19 on BGA, 5 on CSP)
Supported TCXO Frequencies	13.0, 16.3676, 16.369, 19.2, 26.0 & 32.7352 MHz
Sensitivity	
Autonomous Cold Start Acquisition	-144 dBm
Assisted Acquisition	-160 dBm
Autonomous Tracking	-160 dBm
Positional Accuracy (CEP50)	
Autonomous Positional Error	<1.0 m
Velocity Accuracy (30 m/s)	
Speed	<0.05 m/s
Heading	<0.2 deg
Time To First Fix (50% @ -130dBm)	
Hot Start	1.3 s
Cold Start	<35 s
Power	
Acquisition	60 mW
Tracking	50 mW
Physical Specifications	
5 mm x 5 mm	CSP-102 ball (500 µm pitch)
7 mm x 7 mm	BGA-72 ball Stacked Flash (650 µm pitch)
10 mm x 10 mm	BGA-144 ball (800 µm pitch)
Ordering Information	
AR1511-AF1B-R	CSP Tape & Reel
AR1511-AN1B	Hybrid fcBGA w/ stacked flash 7x7 (72 pin)
AR1511-AN1B-R	Hybrid fcBGA w/ stacked flash 7x7 (72 pin) Tape & Reel
AR1511-AS1B	fcBGA 10x10 (144 pin)
AR1511-AS1B-R	fcBGA 10x10 (144 pin) Tape & Reel

Atheros Communications is a leading developer of semiconductor system solutions for wireless and wired network communications products. Atheros combines its wireless and networking systems expertise with high-performance radio frequency (RF), mixed signal and digital semiconductor design skills to provide highly integrated chipsets that are manufactured on low-cost, standard complementary metal-oxide semiconductor (CMOS) processes. Atheros technology is used by a broad base of leading customers, including personal computer, networking equipment and consumer device manufacturers.

ATHEROS®

WIRELESS FUTURE. UNLEASHED NOW.™

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