

AR1520 Overview

The Atheros AR1520, featuring the new Atheros FYX™ location core, delivers unmatched navigation accuracy, high sensitivity, fast location fixes, low power consumption and affordability. This precision GPS system consists of the AR1520 IC, the Atheros FYX location core and the host-based navigation software.

- The AR1520 is a highly-integrated, single-chip GPS receiver combining the functionality of a single-conversion GPS RF front-end with an advanced GPS baseband processor.
- The new Atheros FYX location core features a unique dual-engine technology for fast location fixes, unmatched navigation accuracy and low power consumption. Atheros patented search and tracking engines deliver superior performance in a silicon-efficient package that actually reduces solution cost.
- The Atheros FYX 1.0 navigation software now includes Atheros ESP™ technology, which reduces warm start TTF to less than 10 seconds for up to 5 days, with no network connection required.

Higher Sensitivity

The Atheros FYX location core features powerful search engines and dedicated tracking engines. The search engine sensitivity is -147 dBm for unassisted cold starts and -162 dBm for hot starts. The tracking engine sensitivity is -162 dBm.

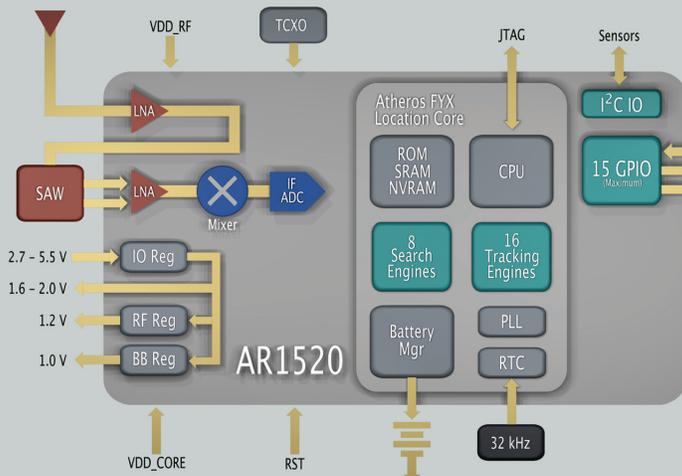
Faster Location Fixes

Atheros ESP (Ephemeris Self-Prediction) technology gathers ephemeris information from the GPS satellites without any network connection, then uses advanced algorithms to reliably predict satellite positions for up to five days. This delivers ESP-start times of less than 10 seconds under most conditions, without the need for network assistance.

Lower Power Consumption

- Dedicated tracking engines allow for power-hungry search engines to be powered down, for high-accuracy urban canyon tracking with GPS core power consumption of less than 30 mW.
- Low power tracking mode enables further tracking power reduction to under 10 mW in suburban settings.
- Total RTC power only 5 uW.

AR1520 System Architecture



AR1520

*Ultimate Accuracy with the
Atheros FYX™ Location Core*



*Featuring the
Atheros FYX
Location Core*

Unmatched Navigation Accuracy

- The heart of the AR1520 solution is the new Atheros FYX Location Core that utilizes a unique dual-engine design, with search engines for fast fixes and dedicated tracking engines for precision navigation.
- The search engines have been optimized for navigation-intensive applications such as personal navigation devices, net-books, smart-books, portable games and media players, and smart phones. They can be run as 8 separate search engines for quicker reacquisition times or combined into one powerful engine for fast startup searches.
- In demanding tunnel-exit situations, these flexible search engines, combined with Atheros Fast Fix Qualification Logic deliver faster and more accurate first fixes.
- The dedicated tracking engines are optimized for tightly tracking weak or highly dynamic signals, rejecting multi-path and providing consistent, accurate measurements.
- In demanding urban canyon environments, the dedicated tracking engines deliver more precise location and heading results.
- When combined with Atheros Variable PDI and High Clock Drift Tolerant software, the dedicated tracking engines also reduce BOM cost by allowing the use of lower grade TCXO's.
- High tracking sensitivity (-162 dBm) ensures reliable navigation when signals are attenuated due to smaller antennas, metalized glass windshields, heavy foliage or skyscrapers.



Introducing the Atheros FYX Location Core



Find Your X. Precisely.

At the heart of the AR1520 GPS chip is the new Atheros FYX Location Core, which delivers the optimal blend of accuracy, high sensitivity, fast fixes and low power. The Atheros FYX Location Core also features an advanced power domain architecture to deliver high accuracy and low power simultaneously.

- **Continuous Tracking** for the highest performance: In demanding urban canyon situations, the search engines enter a low-power background mode. This allows the tracking engines to run while consuming only 30 mW of power in the GPS core.
- **Low Power Tracking** for power savings: In suburban settings, when dynamics are low, the dedicated tracking engines can be run in low power tracking mode which consumes less than 10 mW of power.
- **Atheros Always-Ready™** for A-GPS performance without the network: When network assistance is available, many A-GPS receivers can deliver hot-start performance even if they have been powered down. The Atheros FYX location core delivers hot-start performance with no network connection at all, and uses less than 1 mW of power to maintain this Always-Ready state.

Affordability

The AR1520 has integrated several external GPS system components to minimize the bill of materials and the overall solution cost.

- Integrated LNA and loop filter
- 4.5 V (5.5 V surge) to 1.8 V optional pre-regulator
- 1.2 V RF AFE regulator
- 1.0 V baseband, digital core regulator
- Under 10 external system components required
- Dedicated tracking channels provide high clock drift tolerance, allowing for the Atheros solution to utilize a less expensive, less accurate TCXO without sacrificing navigation performance.

Atheros Communications is a leading developer of semiconductor system solutions for wireless and other 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.



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AR1520 Specifications

Peripheral Interface	2 High Speed UARTs with DMA (to 920 K) I2C Master (up to 400 KHz) I2C Slave (up to 400 KHz) 15 GPIO ports for external I/O 47-bit RTC with battery backup TCXO power switch Timers, counters, and pulse generators, 1.8 V and 3 V I/O compatibility
Supported TCXO Frequencies	16.369, 19.2, 26.0 MHz

Sensitivity

Autonomous Cold Start Acquisition	-147 dBm
Always-Ready Acquisition	better than -157 dBm
Hot Start Acquisition	-162 dBm
Autonomous Tracking	-162 dBm

Positional Accuracy (CEP50)

Autonomous Horizontal Positional Error	<1 m
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Velocity Accuracy (30 m/s)

Speed	<0.2 m/s
Heading	<0.2 deg

Time To First Fix (50% @ -130dBm)

Hot Start	<1.5 s
Always-Ready Start	<1.5 s, typical, depending on use case
ESP Start	<10 s, typical
Cold Start	<33 s

Power

Continuous Tracking	<45 mW @ 1.8 V (<30 mW core power)
Low Power Tracking	<10 mW
Always-Ready Tracking Mode	<1 mW, typical
Battery Backed-up RTC	5 uW

Physical Specifications

4.2 mm x 4.2 mm	CSP-56 ball (500 μm pitch)
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Ordering Information

AR1520A-BF1B	CSP
AR1520A-BF1B-R	CSP Tape & Reel

For more information on the AR1520 or other solutions from Atheros contact your local representative:

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For more information on Atheros and Atheros GPS Technology please visit www.atheros.com
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