

QUALCOMM®

# AR7420

IEEE 1901 compliant HomePlug® AV  
MAC/PHY Transceiver



# AR7420

IEEE 1901 compliant HomePlug AV  
MAC/PHY Transceiver

## Qualcomm® AMP™

This old house has a few new tricks. With connectivity utilizing existing infrastructure, we've got performance wired-in.



Combining Powerline with Qualcomm's rich portfolio of WLAN and Ethernet products, we are transforming networking in the digital home with unified Wi-Fi/PLC/Ethernet gateways, and with dynamic meshed networks employing the nimble combination of Wi-Fi and Powerline adapters throughout the home. The combination of these great connectivity technologies will enable a new class of networking for consumer electronics, computing as well as mobile devices in the home that benefit users with added capacity, flexibility, reliability and ease-of-deployment.

## Solution Highlights

- Supports up to 500 Mbps PHY rates over powerline
- Highly integrated MAC/PHY transceiver, supporting MII and RMII interfaces
- Support for low power EuP directive
- IEEE 1901 and HomePlug AV PHY:
  - Supports OFDM 4096/1024/256/64/16/8 QAM, QPSK, BPSK and ROBO Modulation Schemes
  - 128-bit AES Link Encryption with key management
  - Windowed OFDM with noise mitigation based on patented line synchronization techniques improves data integrity in noisy conditions
  - Dynamic channel adaptation and channel estimation
  - Advanced Turbo Code Forward Error Correction
- IEEE 1901 and HomePlug AV MAC:
  - Priority-based CSMA/CA channel access schemes maximize efficiency and throughput
  - Integrated Quality of Service (QoS) enhancements with programmable packet classification engines and multiple priority queuing
  - Supports IGMP managed multicast sessions
- RoHS Compliant: 10x10 mm, 116 DRQFN, Pb-Free package

## Technology Overview

Qualcomm is committed to addressing the dramatically expanding connectivity requirements of the digital home. The AR7420 is the latest in Qualcomm's AMP Powerline solutions portfolio and is IEEE 1901 and HomePlug AV compliant. This fifth-generation HomePlug AV-based IC delivers carrier-grade broadband communications over powerlines.

For consumers and service providers using powerline, AR7420 technology enables fast, wired networking within a home using the home's existing electrical wiring. It provides last-mile broadband access in multi-dwelling units. The AR7420 delivers PHY rates of 500 Mbps for faster time-on-wire while delivering 100 Mbps of application throughput over powerlines.

## Product Overview

The AR7420 is a Powerline Communications (PLC) transceiver IC. This IC enables the world's smallest, highest performing and lowest power HomePlug AV-based and IEEE 1901-compliant products yet deployed. The chipset operates over a wider spectrum (2 MHz to 68 MHz), delivering over 2x the PHY rate speed of current HomePlug AV solutions.

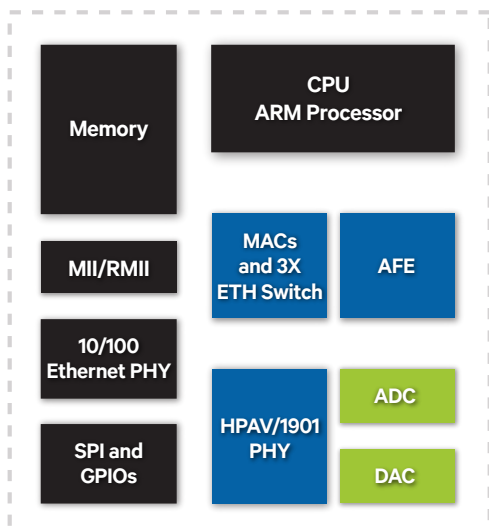
The AR7420 transceiver is optimized for multi-media streaming applications to reliably deliver up to 500 Mbps PHY rate over the home's AC wiring. The AR7420 includes a complete IEEE 1901 and HomePlug AV MAC and PHY, MII/RMII host interface and integrated memory and 10/100 low power Ethernet PHY. The AR7420 includes high-precision A/D (Analog-to-Digital) and D/A (Digital-to-Analog) converters required for analog interface to the AR1540 AFE/Line Driver IC.

The companion chip is the AR1540 Line Driver IC. The AR1540 Line Driver IC includes a Tx filter, a programmable-gain line driver and a programmable-gain Rx amplifier. The amplifier programmability allows signal optimization and multiple country support.





## AR7420 System Architecture



## PL23 Reference Design Highlights

- Based on 5th-generation IEEE 1901 and HomePlug AV compliant AR7420/AR1540 Chipset
- Supports 500 Mbps PHY rates over powerline
- EuP low power directive compliant
- Emissions Compliance
  - FCC Part 15
  - CE class A and class B
- Reference design covers U.S., and Euro plug types

## AR7420 MAC/PHY Transceiver

- IEEE 1901 and HomePlug AV compliant
- Supports MII and RMII interfaces
- Supports Internal Memory and FE PHY
- Support EuP Low Power Directive

## AR1540 Line Driver IC

- Companion to the AR7420 MAC/PHY IC
- Supports 2 MHz to 68 MHz operating frequency
- Integrated Tx Line Driver
- Programmable Tx gain control amplifier

## AR7420 Specifications

Frequency Band	2 – 68 MHz
Network Standard	IEEE 1901 and HomePlug AV
Modulation Technology	Windowed OFDM
FEC Coding	Turbo Code
Hardware Encryption	AES 128-bit
Quality of Service	VLAN/TOS/Packet Classifier/ Quasi Error Free Delivery for IPTV service
Communications Interface	MII/RMII
Peripheral Interface	SPI/GPIO
Memory Interface	Internal
Supported Data Rates	500 Mbps PHY rate
Low Power Design	Support EuP Low Power Directive
Customization Functionality	LED and Programmable Switches
Security	Supports “Simple Connect” with Push Button Encryption and Network Management Key
Diagnostic and Management Interface	HomePlug AV generic and vendor specific Management Message Entries (MME)
Worldwide Regulatory Support	Programmable Power Amplitude adjustments
Tools	Qualcomm Atheros Powerline Toolkit that supports Linux/Windows/RTOS OS  Complete Software Development Kit User Interface Utility

Qualcomm Atheros is a wholly owned subsidiary of Qualcomm Technologies, Inc. and a leading provider of wireless and wired technologies for the mobile, networking, computing and consumer electronics markets. We're focused on inventing technologies that connect and empower people in ways that are elegant and accessible to all.

Our broad connectivity portfolio allows us to offer our global customer base high-performance, end-to-end solutions, featuring Wi-Fi®, GPS, Bluetooth®, FM, Ethernet, HomePlug™ Powerline and PON technologies. By leveraging substantial expertise in RF, signal processing, software and networking we can deliver highly-integrated, low-power, system-level solutions that enable developers to create high-performance, differentiated products.

For more information, please visit us online @ [qca.qualcomm.com](http://qca.qualcomm.com)

