QUALCOMM®

AR7400

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.

The demands of connectivity are growing, but the house is ready to rock thanks to Powerline technology from Qualcomm. Copper power wiring provides the most flexible and scalable spectrum available, capable of reaching virtually any location in any house. Powerline taps this hidden resource to access today's high performance applications and devices, so everyone can experience the magic. And every home can be a digital home. Qualcomm AMP. Performance is in the house.

Technology Overview

Qualcomm is committed to addressing the dramatically expanding connectivity requirements of the digital home. The AR7400 is the latest and fastest in Qualcomm' AMP™ Powerline solutions portfolio and is IEEE 1901 and HomePlug AV compliant. This fourth-generation HomePlug AV-based IC delivers carrier-grade broadband communications over both powerlines and coax.

For consumers and service providers using powerline, AR7400 technology enables fast, wired networking within a home using the home's existing electrical wiring. It performs even faster over coax, providing last-mile broadband access in multi-dwelling units. In these Ethernet-over-Coax applications, it delivers PHY rates of 700 Mbps and up to 350 Mbps of throughput over coax.

Solution Highlights

- Supports up to 500 Mbps PHY rates over powerline and 700 Mbps PHY rates over coax
- Highly integrated MAC/PHY transceiver, supporting MII and RGMII 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: 15x15 mm, 196 LBGA, Pb-Free package

Product Overview

The AR7400 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 AR7400 transceiver is optimized for multi-media streaming applications to reliably deliver up to 500 Mbps PHY rate over the home's AC wiring. The AR7400 includes a complete IEEE 1901 and HomePlug AV MAC and PHY, an Ethernet MII/RGMII Host Interface and an external memory interface that supports SDRAM/DDR memory. The AR7400 includes high-precision A/D (Analog-to-Digital) and D/A (Digital-to-Analog) converters required for analog interface to the AR1500 AFE/Line Driver IC.

The companion chip is the AR1500 AFE/Line Driver IC. The AR1500 AFE/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

AR7400 System Architecture
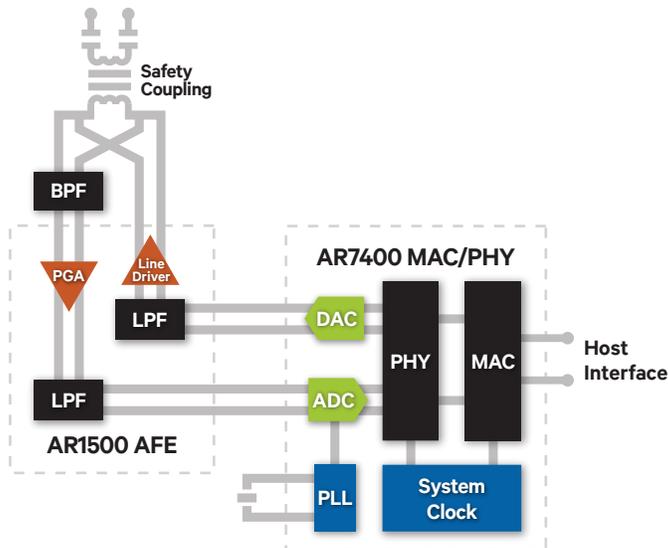
RD7400-GE
Reference Design Highlights

- Gigabit Ethernet Wall Adapter Reference Design
- Based on 4th-generation IEEE 1901 and HomePlug AV compliant AR7400/AR1500 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

AR7400 MAC/PHY Transceiver

- IEEE 1901 and HomePlug AV compliant
- Supports MII and RGMII interfaces
- Supports SDRAM/DDR Memory
- Support EuP Low Power Directive

AR1500 AFE/Line Driver IC

- Companion to the AR7400 MAC/PHY IC
- Supports 2 MHz to 68 MHz operating frequency
- High precision low-noise receiver
- Integrated Tx Line Driver
- Programmable Tx gain control amplifier

AR7400 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/RGMII
Peripheral Interface	SPI/GPIO/UART/I2C
Memory Interface	SDRAM/DDR
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	HomePlug AV generic and vendor specific
Management Interface	Management Message Entries (MME) TR-069 Remote Management
Worldwide Regulatory Support	Programmable Power Amplitude adjustments
Tools	Qualcomm Powerline Toolkit that supports Linux/Windows/RTOS OS
	Complete Software Development Kit User Interface Utility