QHS450 Reference Design

World's First 802.11b/g/n 4x4 MIMO 2.4GHz Single Chip

Up to 450 Mbps Link Speed and 200 Mbps Data Throughput

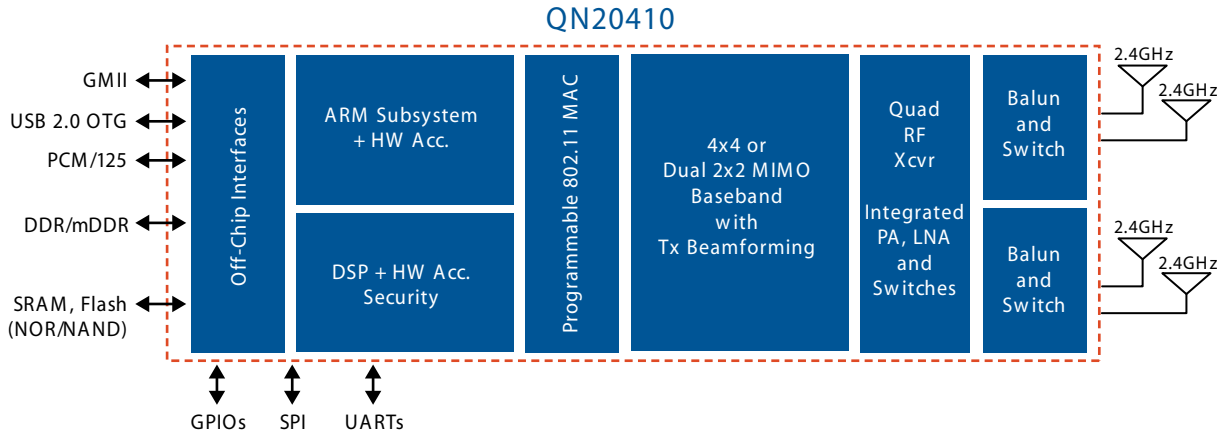
Quantenna Communications

QHS450 Overview

The QHS450 is an 802.11b/g/n 4x4 MIMO chip that is integrated into wireless home and enterprise networking equipment, as well as consumer electronics devices, for an unprecedented level of reliability and performance of up to 450 Mbps. It is the world's most fully integrated solution to combine integrated mesh networking, transmit (Tx) beamforming, and a 4x4 radio transceiver/antenna to deliver guaranteed high-speed bandwidth for total coverage of any size home or office, anywhere.

The QHS450 chipset includes four RF transceivers and associated power amplifiers (PAs), low noise amplifiers (LNAs) and Tx/Rx switches, which eliminate the need for external front end modules and enables game-changing size, power and performance. The advanced silicon also features an advanced MIMO baseband and media access controller (MAC), and provides tremendous processing capability using dual ARM CPUs and DSPs along with application specific hardware acceleration.

QHS450 4x4 MIMO 802.11b/g/n Block Diagram



Features

- Advanced MIMO techniques including Tx beamforming, STBC and channel state aware link management using real time spectrum analysis for sustained link robustness.
- 4x4 MIMO operation.
- Integrated ARM-based network processor with hardware assist to manage multiple simultaneous 802.11b/g/n connections and to optimize throughput using channel state aware routing and fast relay.
- Integrated DSP engine for VoIP processing and higher layer security acceleration.
- Four 2.4GHz 802.11n RF transceivers with integrated high-efficiency PAs, LNAs and switches.
- On-chip diplexer, baluns and switches to reduce system size and BOM.
- Advanced vector mesh networking.

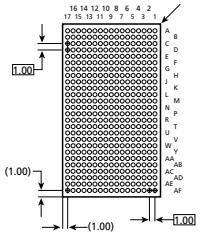
Applications

Vector Mesh Router, Access Point/Router, Wireless Gateways and Multimedia Gateways.

Benefits

- Configurable 4x4 MIMO 802.11b/g/n solution using 4x4 2.4GHz RF subsystems with integrated baseband and MAC.
- Integrated ARM CPUs and associated hardware assist, including higher layer security functions such as IPSec and VPN.
- Onboard 4-channel VoIP termination using SIP v2.
- Lowest BOM for AP/router and vector mesh router.
- Mesh networking with 4x4 and Tx beamforming ensures guaranteed high-speed wireless bandwidth.

Package Information



QHS450 Specifications

Wireless Interfaces

4x4 MIMO using 2.4GHz RF subsystems with integrated Wi-Fi 802.11b/g/n baseband and MAC and support for up to two spatial streams (MCS15) 4x4 antenna combination.

Standards: 802.11n, 802.11b/g, 802.11i (WEP, WPA/WPA2, RADIUS), 802.11d, 802.11e (WMM, WMM-PS), 802.11j, 802.11h, 802.11k, 802.11s (Draft).

Operating Frequencies: 2.4-2.5GHz.

Aggregate Data Rate: 450Mbps.

Data Rates per Spatial Stream:
40MHz: 300, 270, 243, 216, 162, 108, 81, 54, 27.
20MHz: 144, 130, 117, 104, 78, 52, 39, 26, 13.
Legacy: 1, 2, 5.5, 11; 6, 9, 12, 18, 24, 36, 48, 54.

Power Output (at PA Output):
18 dBm.

Communications Interfaces

GMII (WAN, and LAN Switch) for GigE Ethernet USB 2.0 OTG with integrated USB PHY. PCM to external Audio DAC/ADCs.

Memory Interfaces: DDR, Flash and Serial EEPROM.

Peripheral Interfaces: GPIO, UARTS, SPI.

Software Support

Quantenna OS: Quantenna OS running on the integrated network processor enables equipment vendors to develop and port their own features and enhancements for value-add and additional BOM cost reduction.

Software Package: Complete software package for standard Access Point/Router and Vector Mesh Router in Linux with standard APIs to allow for easy porting. Support for reference VoIP stack.

Certifications: Worldwide Regulatory, Wi-Fi 802.11b/g/n (WPA, WPA2 Personal/Enterprise, WMM, WMM-PS), WHQL, CCX.

Input Supply Requirements

1.2v, 2.5v and 3.3v.

Physical Specifications

QM20410 17mm x 27mm (459mm^2)

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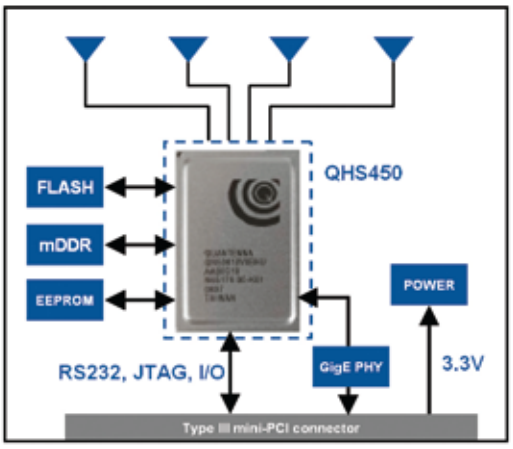
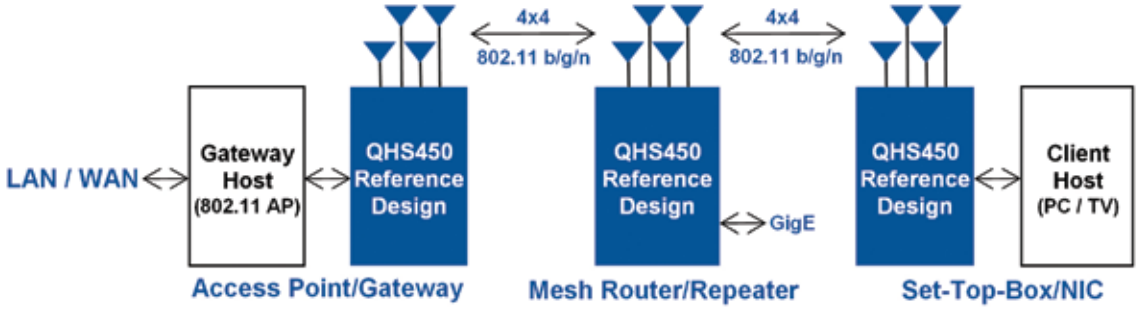


Features

- QHS450 802.11b/g/n 4x4 chip
- Compact PCB form factor
- 32 Mbyte mobile DDR SDRAM
- 16 Mbyte NOR Flash
- Gigabit Ethernet PHY
- Type IIIA mini-PCI connector
  - Mini-PCI LAN bus (Ethernet)
  - RS232
  - JTAG
  - LEDs
  - 3.3VDC
- On board switching regulators
- On board clock circuitry

QHS450 4x4 MIMO 802.11b/g/n Applications



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