

# QHS1000 Reference Design

## World's First Configurable 4x4 MIMO Concurrent Dual Band Chipset

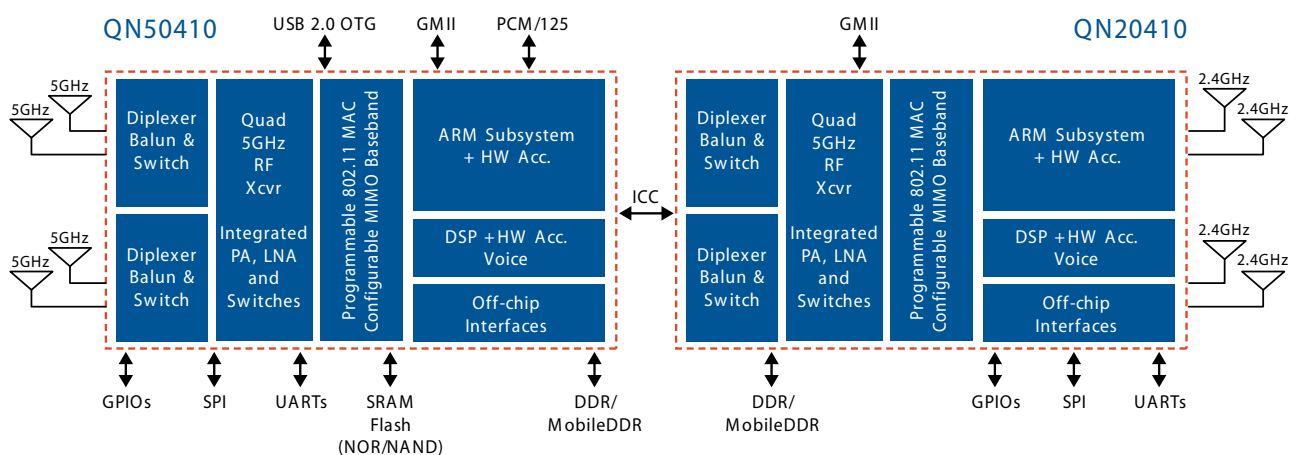
Up to 1 Gbps Link Speed and 600 Mbps Data Throughput

### QHS1000 Overview

The QHS1000 is an 802.11a/b/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 1 Gbps. It is the world's most fully integrated solution to combine integrated mesh networking, transmit (Tx) beamforming, a 4x4 radio transceiver/antenna and concurrent dual band mode in either 2.4GHz and 5GHz to deliver guaranteed high-speed bandwidth for total coverage of anysize home or office, anywhere.

The QHS1000 chipset includes eight 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.

### QHS1000 4x4 MIMO Concurrent Dual Band Chipset



### Features

- Concurrent dual band operation in 2.4GHz and 5GHz.
- Advanced MIMO techniques including transmit beamforming, STBC and channel state aware link management using real time spectrum analysis for sustained link robustness.
- Dual ARM-based network processor with hardware assist to manage multiple simultaneous 802.11a/b/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 and four 5GHz 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.

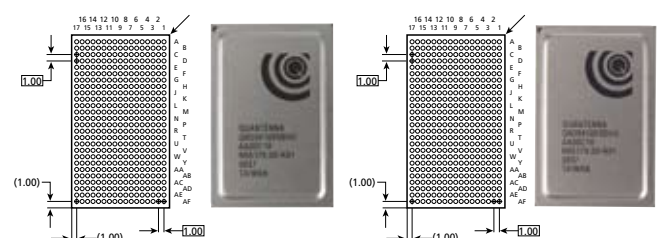
### Applications

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

### Benefits

- Configurable Dual 4x4 MIMO 802.11a/b/g/n solution using 4x4 5GHz and 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



## QHS1000 Specifications

### Wireless Interfaces

Dual 4x4 MIMO using 4x4 5GHz and 4x4 2.4GHz RF subsystems with integrated Wi-Fi 802.11a/b/g/n baseband and MAC and support for up to two spatial streams (MCS15) 4x4 antenna combination.

**Standards:** 802.11n, 802.11a/b/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, 4.9-5.85GHz.

**Aggregate Data Rate:** 1.044Gbps Dual 40MHz in 5GHz, 40MHz + 20MHz in 2.4GHz.

### 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):** 2.4GHz 18 dBm, 5GHz 18 dBm.

### Communications Interfaces

Dual GMII (WAN, and LAN Switch) for GigE Ethernet Dual 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 802.11a/b/g/n (WPA, WPA2 Personal/Enterprise, WMM, WMM-PS), WHQL, CCX.

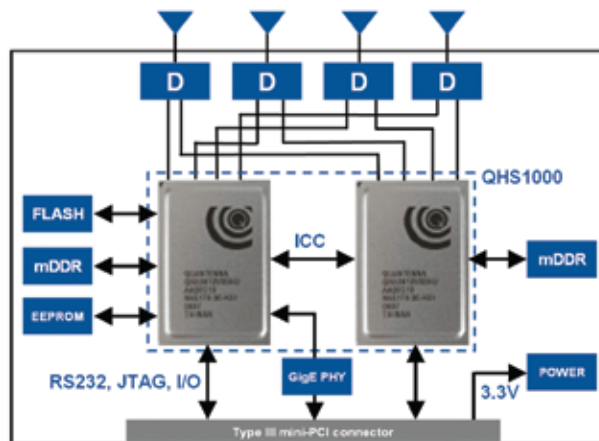
### Input Supply Requirements

1.2v, 2.5v and 3.3v.

### Physical Specifications

QM20410	17mm x 27mm (459mm <sup>2</sup> )
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QHS1000 System	48mm x 58mm (2,784mm <sup>2</sup> )

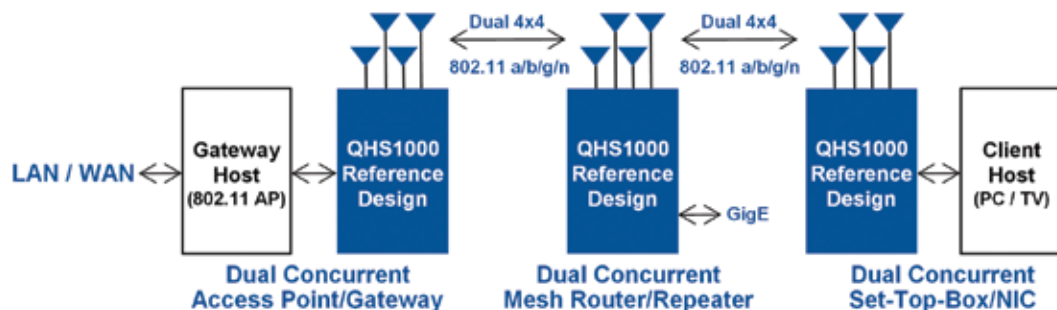
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### Features

- QHS1000 802.11a/b/g/n 4x4 chipset
- Compact PCB form factor
- 2 x 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

## QHS1000 4x4 MIMO Concurrent Dual Band Applications



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