

Specifications for 802.11a and b/g WLAN Router

RT400W

Revision: 0.1

PCD Global (214) 432-0306

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Chapter 1 Introduction

RT400W is 802.11a and 802.11b/g dual band Wireless Router device. This wireless broadband router is a multi-function device featuring a wireless 54Mbps Access point, a 4-port LAN switch and a WAN port, which extends the existing broadband Cable/ADSL connection. It allows the Internet connection to be shared through either the 54Mbps Access Point feature or the 10/100Base-TX Ethernet switch, which also eliminates the purchase of additional hub or switch. Now the wired and wireless networks are integrated to enjoy various bandwidth-consuming applications over the Internet.

Chapter 2 Hardware Architecture

2.1 Hardware Diagram

TBD

2.2 Main Chip Set Information

The three-chip solutions: the AR5002AP-X chip set includes the AR5112, AR2112 and the AR5312, and supports 802.11a and b/g WLAN.

2.2.1 CPU/MAC/Baseband Processor: Atheros SOC AR5312

The Atheros AR5312 is part of the three-chip AR5002AP solution for dual, concurrent IEEE 802.11a/b/g (2.4/5GHz) wireless local area network access point applications. The AR5312 supports 802.11^a/b/g MAC/baseband processing; two 802.3 MAC and MII interfaces to external Ethernet PHY; SDRAM controller; external memory interface for Flash, ROM or RAM; GPIO; LED controls; a high-speed UART with DMA supporting data rates up to 1 Mbps for serial port applications; and a flexible local bus. When combined with the AR5112s Radio-on-a-Chip (RoC), the AR5002AP chipset enables a cost effective silicon solution for dual WLAN access point application.

The AR5312 implements a half-duplex, orthogonal frequency division multiplexing (OFDM) baseband processor supporting all IEEE 802.11a/g data rates (6 to 54 Mbps) and all IEEE 802.11b complementary key coding (CCK) data rates (1 to 11 Mbps). When in Atheros Super G™ or Super A/G™ mode, the AR5312 support data rates up to 108 Mbps. Additional features include forward error correction coding at rates for 1/2, 2/3, and 3/4, signal detection, automatic gain control, frequency offset estimation, symbol timing, channel estimation, error recovery, enhanced security, and quality of service (QoS). The AR5312 performs receive and transmit filtering for IEEE 802.3 and 802.11 networks.

2.2.2 Radio: Atheros AR5112

The Atheros AR5112 is part of the two-chip solution, for dual-band, multi-mode, IEEE802.11a/b/g (5/2.4 GHz) wireless local area networks (WLANs). When combined with AR5212, this chip set enables a high performance, low cost, compact solution that fits onto one side of a PC Card or MiniPCI Card.

The AR5112 can operate in either the 2.4 GHz frequency bands or the 5 GHz band. The transmitter combines baseband in-phase (I) and quadrature (Q) signals, up-converts them to the desired frequency channel, and drives the RF signal off-chip through the integrated power amplifier.

The receiver uses an integrated, dual conversion architecture and requires no off-chip intermediate frequency (IF) filters. The frequency synthesizer operates with 10 MHz steps to match the frequency channels defined by IEEE 802.11a, 802.11b, and 802.11g as well as supporting the Atheros Turbo Mode. An on-chip crystal oscillator allows clock generation with a single external crystal configuration.

2.2.3 Radio: Atheros AR2112

The Atheros AR2112 is part of the two-chip solution for IEEE 802.11b/g (2.4 GHz) wireless local area networks (WLANs). When combined with AR5212, this chip set enables a high performance, low cost, compact solution that easily fits onto one side of a PC Card or MiniPCI Card.

The AR5112 can operate in either the 2.4 GHz frequency bands. The transmitter combines baseband in-phase (I) and quadrature (Q) signals, up-converts them to the desired frequency channel, and drives the RF signal off-chip through the integrated power amplifier.

The receiver uses an integrated dual conversion architecture and requires no off-chip intermediate frequency (IF) filters. The frequency synthesizer operates with 10 MHz steps to match the frequency channels defined by IEEE 802.11b/g as well as supporting the Atheros Turbo Mode. An on-chip crystal oscillator allows clock generation with a single external crystal configuration.

Chapter 3 Hardware Specifications

WAN	H/W Interface	RJ-45×1
	Standard	IEEE802.3
	S/W Interface	100BASE-TX/10BASE-T (Auto MDI-X crossover)
	Transmission Speed	100Mbps/10Mbps
	Full/Half Duplex	Full/Half Duplex (Auto Switch)
LAN	H/W Interface	RJ-45×4
	Standard	IEEE802.3
	S/W Interface	100BASE-TX/10BASE-T (Auto MDI-X crossover)
	Transmission Speed	100Mbps/10Mbps
	Full/Half Duplex	Full/Half Duplex (Auto Switch)
Wireless LAN Interface	Specification	IEEE 802.11a Standard IEEE 802.11b Standard IEEE 802.11g Standard
	Frequency Band	5GHz frequency Band 5,150MHz ~ 5,250MHz 34CH, 38CH, 42CH, 46CH 2.4GHz frequency Band 2,412MHz ~ 2,472MHz, 2484MHz 1CH ~ 13CH, 14CH
	Modulation	802.11a mode OFDM: IEEE802.11a 802.11b mode DS-SS: IEEE802.11b 802.11g mode OFDM: IEEE802.11g
	Transmission Speed	802.11a mode 54Mbps `48Mbps `36Mbps `24Mbps `18Mbps `12Mbps `9Mbps `6Mbps (54Mbps & 48Mbps 64QAM `36Mbps & 24Mbps 16QAM `18Mbps & 12Mbps QPSK `9Mbps & 6Mbps BPSK) 802.11b mode 11Mbps `5.5Mbps `2Mbps `1Mbps ` (11Mbps & 5.5Mbps CCK `2Mbps DQPSK `1Mbps DBPSK) 802.11g mode 54Mbps `48Mbps `36Mbps `24Mbps `18Mbps `12Mbps `9Mbps `6Mbps (54Mbps & 48Mbps 64-QAM `36Mbps& 24Mbps 16-QAM `18Mbps & 12Mbps QPSK `9Mbps & 6Mbps BPSK)
	Indoor-Distance Range (Estimate)	54Mbps (20m) ~ 6Mbps (90m): 802.11a mode 54Mbps (20m) ~ 1Mbps (90m): 802.11g+b mode 11Mbps (20m) ~ 1Mbps (90m): 802.11b mode
	Outdoor-Distance Range (Estimate)	54Mbps (30m) ~ 6Mbps (300m): 802.11a mode 54Mbps (30m) ~ 1Mbps (300m): 802.11g+b mode 11Mbps (50m) ~ 1Mbps (300m): 802.11b mode
LED Function Status	POWER (Green)	<input type="checkbox"/> “Solid Green”: Power On <input type="checkbox"/> “OFF”: Power Off
	Wireless (Green)	<input type="checkbox"/> “Solid Green”: Wireless Enable <input type="checkbox"/> “Blinking Green”: Wireless Activity <input type="checkbox"/> “OFF”: Wireless Disable
	Internet (Green)	<input type="checkbox"/> “Solid Green”: Connected to Internet <input type="checkbox"/> “Blinking Green”: Data being Transferred <input type="checkbox"/> “OFF”: No Connected to Internet
	LAN1~4 (Green)	<input type="checkbox"/> “Solid Green”: Computer 1, 2, 3 or 4 linked to network <input type="checkbox"/> “Blinking Green”: Data is Transferring on computer 1, 2, 3 or 4 <input type="checkbox"/> “OFF”: Computer 1, 2, 3 or 4 not connect to network

	Dimension	Hardware: TBD(W)×TBD(D)×TBD(H)mm (not including Antenna) Stand: TBD(W) x TBD(D) x TBD(H) mm
	Power Adaptor	Input: 100VAC +/- 10% 50/60Hz, Output: 5VDC, 2A
	Power Consumption	8.0W (max)
	Current Consumption	1.6A (max) @ a, b, g modes
TX Power	11a mode 11b mode 11g mode	18dBm@6Mbps; 13dBm@54Mbps 18dBm@1Mbps & 11Mbps 18dBm@6Mbps; 14dBm@54Mbps
RX Sensitivity	11a mode 11b mode 11g mode	-88dBm@6Mbps; -68dBm@54Mbps -90dBm@1Mbps; -85dBm@11Mbps -88dBm@6Mbps; -68dBm@54Mbps

Chapter 4 Reliability Test

4.1 MTBF Calculation

MTBF = Hours (To be calculated)