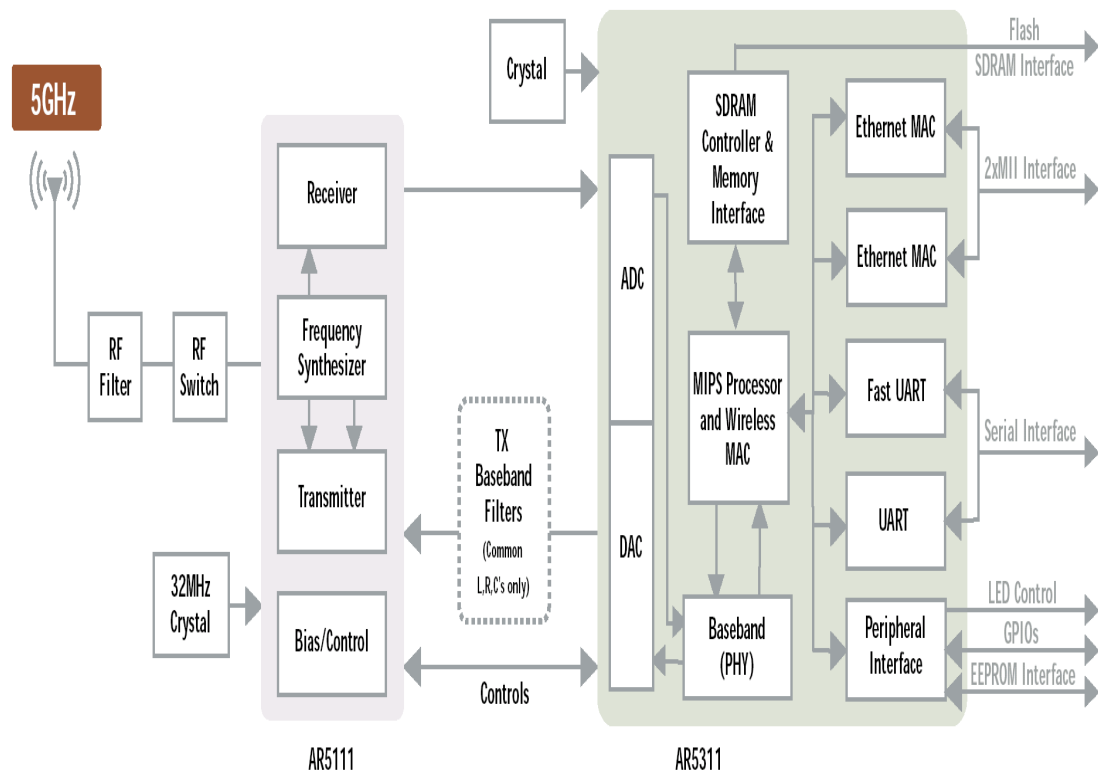# MTI BR5811 Operation Description

MTI 802.11a wireless outdoor turbo bridge, BR5811 is a wireless building-to-building bridge solution, BR5811 provide the data rate up to 108 Mbps that is best suited for enterprises, campus or off-site locations that require LAN or Internet access without the availability of wired networks to extend the network coverage. BR5811 provides the point to point and point to multi-point fixed connection.

The wireless building-to-building bridging solution contains a state of the art wireless Bridge, high gain performance 17 dBi internal flat panel antenna and Power over Ethernet. For further protection, the bridge and Power over Ethernet adapter have build-in lightning protector.

Supporting up to 16 station associations including the Bridge itself. Rates of 6 to 54 Mbps are supported in standard IEEE 802.11a modes, and up to 108 Mbps in Atheros Turbo Mode. All 802.11a transmission rates are supported across the 5.15 to 5.85 GHz spectrum.

With integrated microprocessor, MAC, baseband functionality, and Radio-on-a-Chip (RoC), the AR5001AP Access Point Solution provides the crucial building blocks for enterprise-quality WLAN access points. Use of the Advanced Encryption Standard (AES) resolves security concerns.This two-chip set represents the most highly integrated solution ever offered for implementing WLAN access points, thus reducing the cost and complexity of wireless networking.

Block diagram showing AR5111 and AR5311 chipset components.

AR5111 section: 5GHz antenna, RF Filter, RF Switch, Receiver, Frequency Synthesizer, Transmitter, 32MHz Crystal, Bias/Control, TX Baseband Filters (Common L,R,C's only), Controls

AR5311 section: Crystal, ADC, DAC, SDRAM Controller & Memory Interface, MIPS Processor and Wireless MAC, Baseband (PHY), Ethernet MAC, Ethernet MAC, Fast UART, UART, Peripheral Interface, Flash SDRAM Interface, 2xMII Interface, Serial Interface, LED Control, GPIOs, EEPROM Interface

Chipset overview

The AR5001AP Access Point Solution comprises two low-power chips, each of which rely exclusively on standard-process CMOS. As a result, the chip set delivers reliable, costeffective connectivity. The chipset includes:

AR5311 802.11a Access Point MAC/ baseband processor

- Integrated 32-bit MIPS R4000-class processor
- Two 10/100 Ethernet MACs
- One Bluetooth-ready 1-Mbps UART and one 115-kbps UART
- One local bus interface
- Smart Select™ technology automatically chooses the data rate, error-correction mode, radio channel, power-management method, and security technology best suited to any situation • Integrated analog-to-digital and digital-toanalog converters
- SDRAM and Flash memory Interface
- Low-power operational and sleep modes

AR5111 5-GHz
Radio-on-a-Chip (RoC)

AR5311 802.11a Access Point
MAC/baseband processor
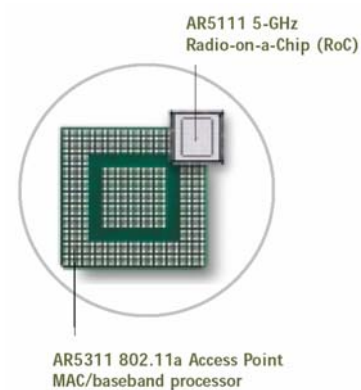
Highlights

- Support for IEEE 802.11a
- Uses CMOS technology exclusively, minimizing power consumption and cost while maximizing reliability • Highly integrated 2-chip set
- 5-GHz Radio-on-a-Chip
- 802.11a MAC/baseband processor
- Second-generation 802.11a technology
- Full line-speed support for the Advanced Encryption Standard without performance degradation. Legacy support for TKIP and WEP
- Quality of Service support (QoS)
- 108-Mbps Turbo Mode
- Dynamic Frequency Selection/Transmit Power Control (DFS/TPC) for international operation
- Extended 802.11a tuning range: 5.150 -5.850 GHz
- Support for draft IEEE 802.11e, f, h, and i standards • Enhanced performance, transmission range and reliability

Applications

- Access points that bridge 802.11a to an enterprise network backbone
- Access points that bridge 802.11a and Bluetooth to an enterprise network backbone
- SOHO/residential gateways
- Residential media gateways that share video and data in the home
- Ethernet bridge for low-cost wireless connection to devices such as cable modems
- Local-bus bridge

In an enterprise or public "hot spot" application, the AR5001AP's two Ethernet MACs can be used to connect to both an Ethernet LAN backbone and an existing 802.11b WLAN access point, which then passes data through the AR5001AP. For homes, the dual MACs can connect to both a broadband Internet pipe and an access switch supporting multiple PCs and entertainment devices.

AR5111 5-GHz Radio-on-a-Chip (RoC)

- Dynamic IF Dual Conversion architecture provides super-heterodyne performance at Zero IF prices
- Support for IEEE 802.11a standard
- Integrated second-generation power amplifier (PA) and low-noise amplifier (LNA)
- External PA and/or LNA can be used for special applications
- Enhancements to the transmit and receive chains

- Eliminates all IF filters and most RF filters; no external voltage-controlled oscillators (VCOs) or surface acoustic wave (SAW) filters needed
-

Second-Generation 802.11a

At the heart of the AR5001AP Access Point Solution is Atheros second-generation 802.11a technology. This technology includes the secondgeneration implementation of the Orthogonal Frequency Division Multiplexing (OFDM) modulation scheme with 15 advances in OFDM radio design. As the modulation scheme for both 802.11a and the draft 802.11g standards, OFDM is key to high-performance wireless networking.

OFDM mitigates multipath intersymbol interference at high data rates by simultaneously transmitting multiple subcarriers on orthogonal frequency channels. Each subcarrier is modulated at a low symbol rate. Because this approach is tolerant of many common channel impairments, OFDM improves range and reliability, making it the ideal choice for supporting multiple high-bandwidth tasks in real time.

AR5001AP Chipset Specifications

Frequency Band	5.150 - 5.850 GHz	
Network Standard	802.11a	
Network Architectures	Ad hoc, Infrastructure	
Modulation Technology	OFDM	
Modulation Techniques	BPSK, QPSK, 16 QAM, 64 QAM	
FEC Coding Rates	1/2, 2/3, 3/4	
Security		
Encryption	AES, TKIP, WEP	
Authentication	802.1x	
Quality of Service	802.11e draft	
Media Access Technique	CSMA/CA	
Communication Interface	High Speed UART, UART, 2x MII	
Peripheral Interface	EEPROM, GPIOs, LEDs	
Memory Interface	Flash, SDRAM	
Supported Data Rates		
IEEE 802.11a Standard Mode	6 - 54 Mbps	
Atheros Turbo Mode	12 - 108 Mbps	
Chip Specifications	AR5111	AR5311

Operating Voltage	2.5V +/- 5%	2.5V +/- 10%
	3.3V +/- 10%	3.3V +/- 10%
Package Dimensions	9mm x 9mm	21mm x 21mm
Packaging	64 LPCC	388 PBGA

AR5001AP Features Include

- Full hardware support for Advanced Encryption Standard (AES) security—at full line-speed with no performance degradation. Support for Temporal Key Integrity Protocol (TKIP) and WEP.
- Quality of Service (QoS) for real time video, audio voice
- Dynamic Frequency Selection (DFS) and Transmit Power Control (TPC) for international use
- Up to 108-Mbps Atheros Turbo Mode™ in addition to standard rates of 6, 9, 12, 18, 24, 48 and 54-Mbps
- Smart Select™ optimization of data rate, error-correction mode, radio channel, power-management, and security
- Superior link robustness through proprietary channel estimation and error correction, as well as low noise, high linearity, RF front end and analog baseband circuits.
- Extended 5.150 to 5.850-GHz tuning range

Product Configurations

The base hardware is an outdoor mountable metal enclosure. The BR5811 can be managed via the network station remotely. The following are available product configurations:

Fast Ethernet managed 802.11a wireless outdoor turbo bridge

Outdoor Mounting Kit

One POE Power Injector

One POE Ethernet cable

One POE Power Core

Hardware Installation

Installation procedures are generally outlined as follows:

- Verify system configuration
- Installing the ODU
- Installing the POE

- Mounting and alignment the antenna

- Connecting external equipment

You may need to use Web Browser to change or set the MTI BR5811 system's operating parameters. Refer to chapter 3, Bridging network attachment and configuration, for more information.

Grounding

Proper grounding of equipment and structures is essential to prevent electrical damage to the MTI BR5811 system.

Grounding of all equipment at a radio site is required. Without proper grounding, voltage potentials between components of the system can cause electrical damage when interconnecting cables are installed.

It is recommended that the ODU be installed with lightning rod protection. Also, to avoid surge current caused by lightning circulating to the equipment earth system, connect the equipment earth system (true ground) to the lightning rod ground.

Please connect the ground node to the existing ground.

Note: Ground wires and hardware are not provided in the installation kit.

Installing the ODU

The MTI BR5811 can be mount on a 2" Steel or Stainless Steel Tube. You can reference the Figure.