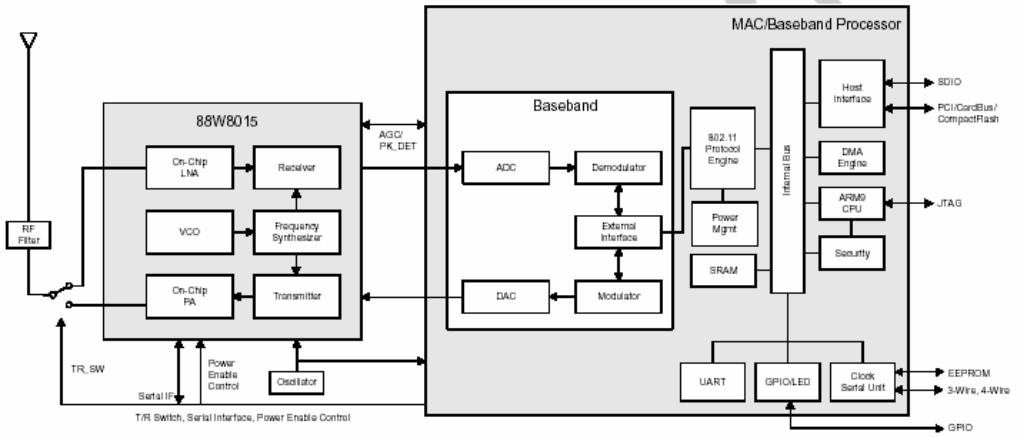
MARVELL® 2.4 GHZ WLAN SOLUTIONS

Marvell chipsets offer high integration, superior performance, and low-cost solutions for development of WLAN applications and provide complete 802.11g/b WLAN solutions from the RF transceiver through the MAC layer.

The 88W8015 paired with the Marvell 88W83xx family of integrated WLAN SoC devices supports client card functionality for small form-factor (CF, SDIO) mobile applications. Figure 2 shows an example chipset client solution for 802.11g/b client applications.

Figure 2: 88W8015 + WLAN SoC Chipset for Small Form-Factor Applications

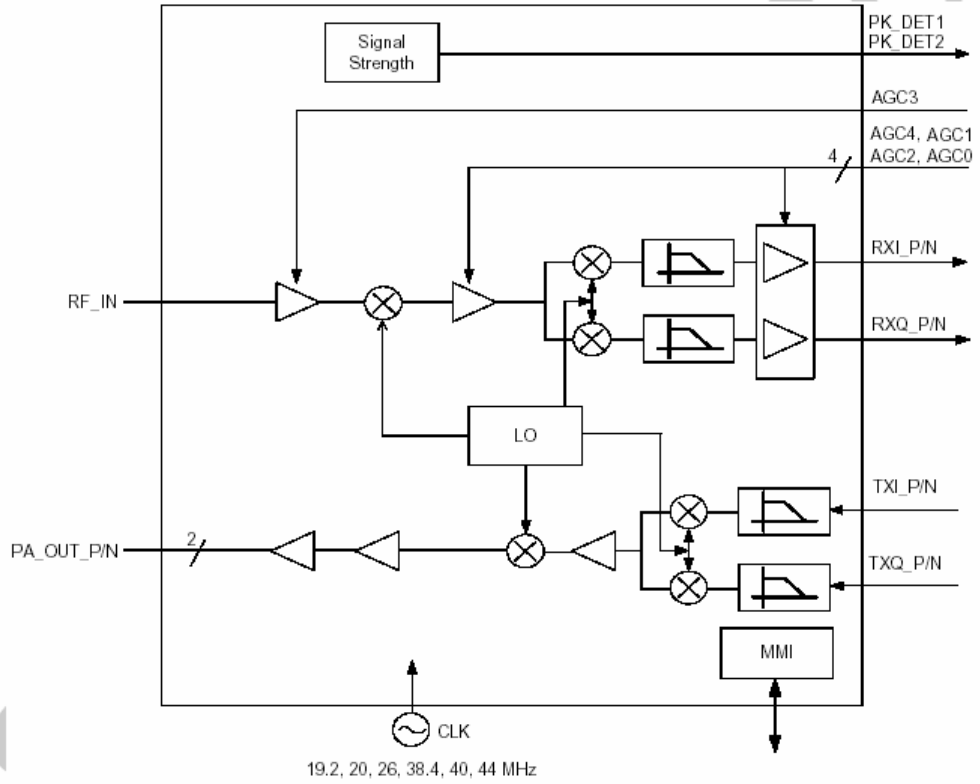


2.3 Transceiver Architecture

Figure 8 shows a simplified block diagram of the 88W8015 RF transceiver.

The device integrates all the necessary functions for receive and transmit, including LNA, up and down converters, adjustable gain amplifier, filter, pre-driver, and power amplifier.

Figure 8: Simplified Block Diagram



2.5 Receive Path

The 88W8015 receiver consists of the following:

- 2.4 GHz LNA/mixer combination
- variable gain IF amplifier
- quadrature demodulator
- pair of baseband LPFs
- programmable gain amplifiers (analog signal processing on the quadrature demodulated signals)

The 88W8015 is designed to coexist with cellular phone applications technology. The receiver incorporates high jammer immunity circuitry to prevent degradation to the sensitivity of the receiver from high power cellular phone transmission signals.

2.5.1 Receive Automatic Gain Control

The 88W8015 supports a proprietary AGC interface between the 88W8015 and baseband processor on the PK_DET1, PK_DET2, and AGC4, AGC3, AGC2, AGC1, AGC0 pins. To manage overall gain distribution, the total gain is distributed among the RF, IF, and baseband stages. The total gain is realized through variable gain stages within each of the RF, IF and baseband sections.

A number of peak detectors are placed along the Rx signal path to sense the signal and interferer strength. These detectors provide essential information to the gain control logic to optimally distribute the total gain among the RF, IF, and baseband stages. The gain in the Rx path is dynamically distributed to achieve optimal performance in terms of noise and linearity based on the signal conditions.

The gain adjustment of the integrated LNA and AGC is seamlessly controlled by the baseband processor functions integrated into the client or AP WLAN SoC device. The entire receive path has over 90 dB of voltage gain and 90 dB of gain control range.

2.5.2 Baseband Circuits

The quadrature demodulator down converts and I/Q splits the signal received to in-phase and quadrature phase. Signals are then passed through a pair of LPFs to reject the adjacent channel energy, and a pair of variable gain stages amplify the signal to the full scale of the analog to digital converters.

Both the corner frequency of the LPF and the offset of the baseband stages are calibrated automatically. These calibrations occur frequently enough to adjust for changes in environmental conditions.

2.6 Transmit Path

The transmit path includes the following:

- pair of LPFs
- quadrature up-converter
- lower-sideband suppression RF mixer
- variable gain amplifier
- integrated power amplifier

2.6.1 Tx Radio Band Operation

The baseband LPF removes aliasing products from the DAC. The lower-sideband suppression RF mixer enables up-conversion of the signal to desired channel frequency without generating a lower-sideband tone. This eliminates the need for an external image reject RF filter before the power amplifier.

A high efficiency power amplifier is integrated into the 88W8015. The amplifier is configurable into various states to minimize power consumption. The embedded power control loop provides accurate control over the actual transmitted power. The 88W8015 also supports the use of an external PA for very high power applications.

The 88W8015 transmitter is designed to minimize spurious tone emissions in the cellular phone receive band and does not interfere with cellular phone reception.