Birdrock 2.4 GHz WLAN Card – Technical Description

The Birdrock 2.4 GHz Wireless LAN card is an IEEE 802.11b compliant product based on the Intersil PRISM II.V Direct-Sequence Spread Spectrum Wireless LAN chipset. The available data rates are 1Mbps DBPSK, 2Mbps DQPSK, 5.5Mbps CCK, and 11Mbps CCK. This product operates in the 2.4 GHz ISM band, with channels 1-14 available, depending on the restrictions of local regulatory authorities.

The ISL3873 MAC / baseband processor "combo" chip performs all of the necessary MAC layer processing, baseband processing functions (spreading, scrambling, differential encoding, etc) as well as implementing the 5V USB 1.1 host bus functionality. A 48MHz clock oscillator is required for USB interface in the combo chip, while a 44MHz oscillator provides the clock for the baseband functions in the combo chip. The I/Q signalling between the combo chip and the IF quadrature modulator is at a rate of 11Mbps. The combo chip also provides closed loop gain control for both the transmitter and receiver.

The HFA3783 chip contains the quadrature modulator for both transmitter and receiver, as well as variable-gain IF amplifiers for both transmit and receive. The HFA3783 also features an on-chip synthesizer for accurate intermediate frequency (IF) generation and control; the 44MHz oscillator used for the combo chip serves as the source of the reference frequency. A local oscillator of frequency 748MHz is divided down to produce an IF of 374MHz. Control signals from the combo chip are used to set the HFA3783 into either transmit or receive mode exclusively, allowing for the use of a single SAW filter to be shared between the two modes. As such, this product is capable of only half-duplex operation.

The ISL3685 converts between the IF and the radio frequency (RF) channels for both the transmitter and receiver. A local oscillator of 2.038 – 2.110GHz supplies this chip and produces the 14 frequency channels from 2.412 – 2.484GHz. An on-chip synthesizer uses the 44MHz oscillator again as the source of the reference frequency. Power amplification for the transmitter is accomplished by the ISL3985, which has an on-chip power detector for closed loop control of the output power.

Two Rangestar antennas of maximum gain 5dBi are used in a diversity scheme.