Method of Operation

The 802CI products are self contained 2.4Ghz ISM Band Radios. These radios are designed to operate using the 802.11B Wireless LAN Standard for use in Wireless Networking systems. The Radio consists of 5 Major IC's (HFA3983, HFA3683, HFA3783, HFA3683, and HFA3841) in the radio section and 3 other support IC's and it operates in a Half-Duplex mode using the CSMA/CA (Carrier Sense Multiple Access/Collision Avoidance) principle. The radio card interfaces to the PC via a PCMCIA interface.

Receive Path

The receive signal traveling through the air is received by one of the dual diversity antennas. The circuit will switch to the antenna which provides the best reception and strongest signal power. The RF signal then feeds into the 85MHz BW filter and through the Transmit/Receive switch. Then the signal is amplified using the LNA within the HFA3683 and mixed-down to an IF frequency of 374 MHz. The PLL and Synthesizer in the HFA3683 selects the Channel frequency for operation using Low Side Injection. The output of the Mixer in the HFA3683 is shared with the transmit path using a switch. The signal then flows through a image rejection SAW filter which has a 3db bandwidth of 17Mhz. The signal then flows into the HFA3783 Quad IF Downconverter IC, through a two stage Analog AGC circuit which adjusts the gain to compensate for signal gain differences. The output of the Twin AGC's provide a constant signal level to the I and Q Conversion/Downconversion mixers, which convert both the I & Q signals to Baseband. A second Frequency Synthesizer feeds the Twin I & Q mixers with the same frequency signal that is phase shifted by 90 degrees. The output of the twin I & Q mixers then flows into a Dual Active 5^{th} Order Butterworth filter to remove the anti-aliasing components and Images from the down-converted signal.

The twin I & Q signals then flow into the HFA3863 Baseband processor and are converted into digital signals via the dual A/D converters then flow through the digital AGC followed by the Digital Demodulator. The output of the digital demodulator is sent into a I/O interface of the HFA3841 MAC(Media Access Controller). The Received signal then flows into the Phy I/O interface and into the MAC protocol engine. The HFA3841 MAC converts the signal protocol from 802.11B to 802.3 Ethernet then passes that data through the HOST I/O PCMCIA interface to the PC. The transmit signal path is as follows;

Transmit Path

The Ethernet data passes from the PC to the HFA3841 MAC, to the Host I/O interface through the PC CARD. The signal then flows into the Data router where it is converted from the Ethernet to 802.11B protocol. After the signal is converted, a radio preamble and Header is added to the signal and passed to the radio I/O. There is also support circuitry for WEP encryption and the outboard SRAM and flash ROM, which contains the firmware which controls the radio. The signal then flows from the HFA4841 into the HFA3783 as both I & Q signals into the dual Up conversion mixers. Then, the signal upconverts to a IF frequency of 374 MHz and passes into a variable gain amplifier. Next, it passes through the Switched Shared SAW filter into the HFA3683 and then upconverts to a RF frequency from 2.4GHz to 2.485 GHz, depending on the channel selection. The signal then flows through a external Image reject filter, pre-amplifier, and then through a second Pulse shaping filter into the HFA3983 Power amplifier. The output of the power amplifier is then feed through the Transmit/Receive switch, then through bandpass filter with a pass bandwidth of 85MHz, then finally through the strongest signal selected antenna.