Circuit description

The Raylink WHISP card is a 2.4 Ghz frequency hopping spread spectrum half-duplex transceiver designed to allow a PC or other "host" to communicate data in a wireless fashion. The WHISP card plugs into the host through a Personal Computer Memory Card International Association (PCMCIA) standard 68-pin connector.

The Raylink WHISP PC card derives all of its frequency and microprocessor clock timing from a 16 MHz TCXO (reference designation U11 on schematic page 4). The system microprocessor is a 80C154U (generic 8051 8-bit microprocessor), reference designation U501 on page 2 of the schematic. The microprocessor works with a custom-designed Media Access Controller (MAC) and FSK Modulator/Demodulator (MODEM), together in an Application Specific Integrated Circuit (ASIC), shown as U505 on page 3 of the schematic.

Frequency synthesis for both transmit and receive modes is accomplished by means of a National Semiconductor dual-channel phase locked loop (PLL) chip (U21 on block diagram). The PLL derives its reference frequency from the 16 Mhz TCXO U11. The PLL controls a 330 MHz VCO to create an LO for the first IF and a 2052-2130 Mhz VCO (U36) to create a 2402-2480 Mhz transmit band.

In transmit mode, a 20 Mhz baseband frequency shift keying (FSK) signal is synthesized by the modem and sent into the analog domain by D/A converter U16. The signal is amplified, filtered, and then upconverted by mixer U14. The signal, now at a 350 Mhz IF, is channelized by SAW filter FL2, which is shared between the transmit and receive paths. The signal travels to upconverter U2 where it is mixed with the frequency agile LO signal from U36 to generate the transmit signal at 2402-2480 Mhz. This signal is amplified by the power amplifier in U1 to a level designed to provide +20dBm at the antenna jacks. The transmit signal is sent to jack J2, which is connected to an external antenna by means of a unique MMS-style mini coax connector. Jack J3 is left unpopulated in the WHISP version of the Raylink card, and the switch is fixed in the J2 position.

In receive mode, a 2402-2480 Mhz signal is received by the antenna and sent into the WHISP card via jack J2. The signal is amplified by means of a low noise amplifier inside U1, then downcoverted to 350 MHz via U2. The 350 Mhz signal travels through SAW filter FL2 and is downconverted by mixer U3 to 20 Mhz. The 20 Mhz signal enters discriminator U4, where its frequency relative to the center of the 1 MHz band is determined. This FSK information is digitized by A/D converter U7 and sent to the baseband ASIC for processing and transmission to the host computer.