Radio Circuit Description

The JUPITER Spread Spectrum Transceiver operates in the 2.4 Ghz ISM band, using Direct Sequence modulation techniques.

The transmit/receive and data packetization operations are under the control of a protocol processor (MAC) internal to the transceiver assembly.

Logic Section : A digital ASIC is employed in the logic section of the radio, providing the following functions:

> 1) Generation of the spreading code, combination of the code with the incoming data stream.
> 2) Despreading and demodulation of the incoming baseband spread signal.
> 3) Determination of the transmit/receive sequence.

RF Section (refer to JUPITER radio block diagram) : The transmitter chain includes a shaping bandpass filter followed by a vector modulator. This signal is further filter by a saw filter at the IF frequency of 280 Mhz. This signal is then mixed up to the 2400-2483.5 Mhz band. A RF filter at the output of the mixer removes any other mixing products. A power amplifier chain brings the signal up to the final output level of 250 mwatts. Through the TX/RX switch, the signal is passed through a dielectric bandpass filter to the antenna port. The radio has diversity, so two antenna ports are provided. Transmitter frequency is determined by the 44.0 Mhz reference oscillator, with +/- 12 ppm accuracy.

The receiver utilizes the same antenna filtering and TX/RX, followed by a LNA. A mixer circuit brings the signal to the 280 Mhz IF, where a SAW filter shapes the IF spectral envelope. This filter provides the primary rejection against adjacent channel interference. An IF amplifier followed by an IF limiter brings the signal up to the level needed for the I and Q vector demodulator. A buffer amplifier and filter are used to shape the signal for the PHY digital ASIC which despreads and decodes the signal.

The 280 Mhz voltage controlled oscillator is controlled by a synthesizer/PLL system comprised of a prescaler and programmable dividers. The 2132-2185 Mhz voltage controlled oscillator is also controlled by a synthesizer/PLL system. Both local oscillators use a reference signal for the PLL which is derived from the 44.0 Mhz master reference oscillator.