Block Diagram

The *CC1010* Block Diagram is shown in Figure 2 below.

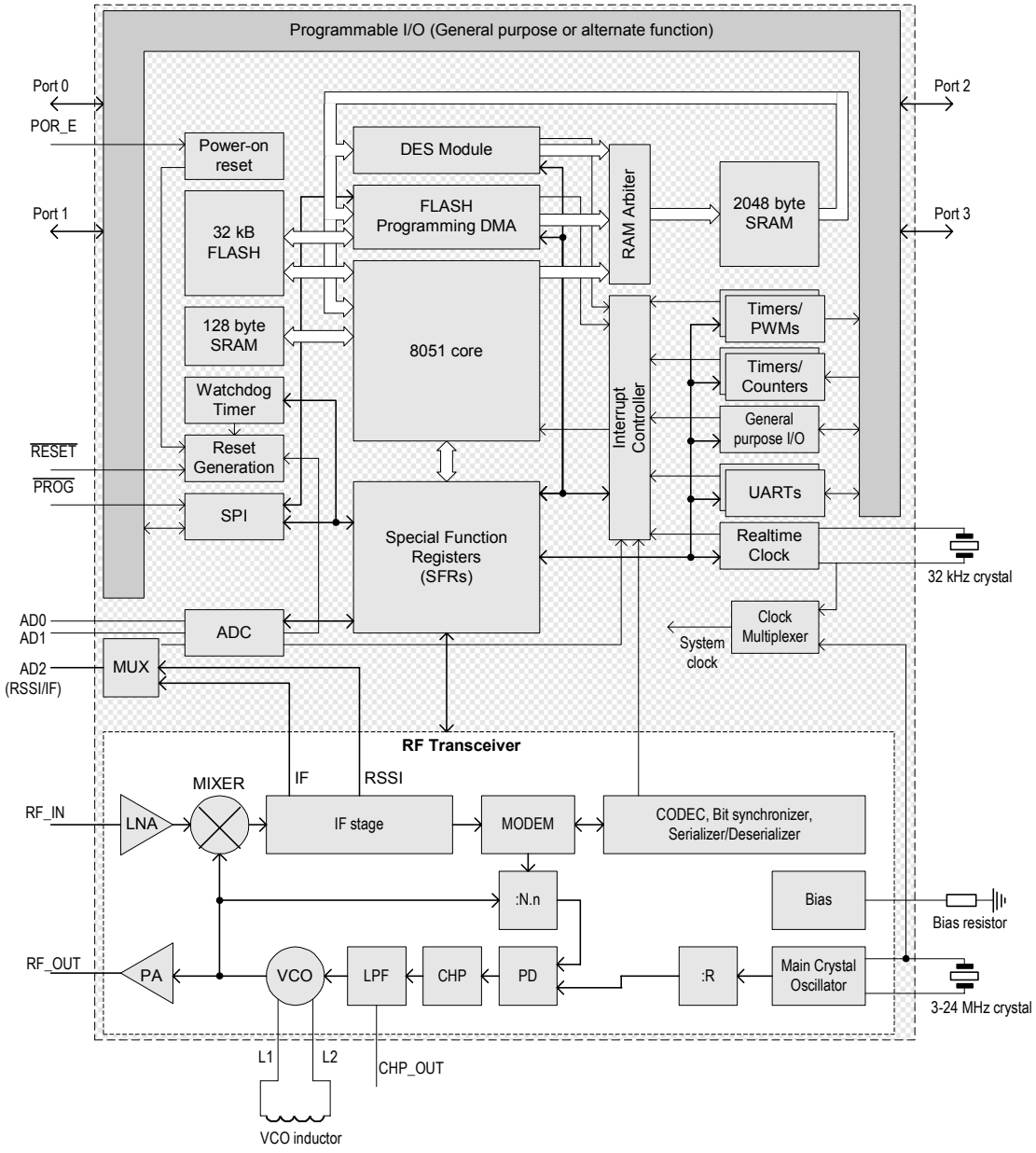

Figure 2. CC1010 Block Diagram

AeroComm AC4490 Theory of Operation

This block diagram describes the internal functions of the Chipcon CC1010 RF chip. This chip contains both the RF transceiver and the entire 8051 microprocessor as well as RAM memory and flash memory for program storage. The embedded program developed by Aerocomm (stored in flash memory on the CC1010) controls the RF transceiver section of the chip in every aspect.

RF TRANSCEIVER

The RF Transceiver section of the CC1010 is composed of a VCO and PLL which generates a LO (Local Oscillator) along with transmitter and receiver hardware.

TRANSMITTER HARDWARE

The transmitter section of the CC1010 chip utilizes the VCO/PLL section. The microprocessor commands the PLL/VCO to different hop channel frequencies. In transmit mode, the LO is modulated by data from the microprocessor in an FSK format at the center of a well defined hop channel frequency. This FSK modulated LO signal is then amplified by the Power Amplifier, and is then routed to the antenna to be radiated.

RECEIVER HARDWARE

The receiver section of the CC1010 utilizes the PLL/VCO hardware to generate a LO which is offset from the center of the defined hop channel frequency by the center frequency of the IF filter (which is also on board the CC1010). In receive mode, the incoming signal is captured by the antenna and routed into the RF IN pin of the CC1010. The incoming signal is amplified by a Low Noise Amplifier and presented to a downconverter mixer. The mixer beats the incoming receive signal with the LO which selects only the desired hop channel frequency to be translated down to the center of the CC1010's internal IF filter. The CC1010's IF filter is designed to match the bandwidth of the transmitted signal and destroy all other RF frequency content. The result is then presented to a digital demodulator which extracts the receive data from the baseband signal.

HOPPING CHANNELS

The hopping channels are defined by Aerocomm in a pseudorandom fashion, and are separated by about 525kHz. The channel separation is greater than the 20dB bandwidth of the transmitted signal (which is about 145kHz). Transmitted data will be equally distributed on the average over the defined hopping channels.

SYNCHRONIZATION

A byte programmed into flash memory indicates that the particular radio is a Server radio or a Client Radio. The Server radio tunes its LO to the next predefined pseudorandom hop channel frequency at the hopping rate. At each hop frequency, the Server radio transmits a beacon containing hop timing information and system flags. A Client radio must first find the Server by scanning the known list of hop channel frequencies until it receives a valid beacon. If this is a valid Server for the Client to be paired with, the Client radio will then begin hopping at the defined hopping rate around the known list of pseudorandom hopping channel frequencies. Once synchronized, the Client can communicate bidirectionally with the Server radio as defined by Aerocomm's embedded RF protocol.