Advanced Control Technologies, Inc.
Technical Description
Project: AZM1207-RE US
Project No.: 0718-01
Project Engineer: Chad Snead

Technical Description:

The AZM1207-RE US is a transceiver module that can be used with different applications.

The transceiver operates in half-duplex fashion to provide two-way communications with other devices. The communications, while varied, most often consist of a command from the remote control followed by an acknowledgement by the addressed module(s) that a valid command was received.

The transceiver operates in the 900MHz ISM band at 908.42 MHz. The data, which is digital in nature, is Manchester encoded and sent using FSK modulation at a 9600 bit/sec rate. The deviation of the modulation is plus and minus 15 KHz

A 7.376974 MHz crystal oscillator is used both as a clock for the micro-controller and a reference oscillator for the fractional PLL frequency synthesizer portions of the ASIC. This PLL is used to generate both the local oscillator for the receiver and the fundamental frequency of the transmitter. The output power of the transmitter portion of the transceiver is controlled by the microcontroller which causes the transmit power to be very low for some setup functions.

Modulation of the transmitter is accomplished in the PLL by having the microcontroller cause it to use one divisor when the binary modulating data is zero (low) and a slightly different one, when it is one (high).

The receiver is a single conversion type. The local oscillator runs at 908.275 MHz (145 KHz below the receive frequency).

A wireless transmission occurs briefly in response to one of two events: 1) A manually issued command initiated by the User via a remote control, or 2) An automated command that is initiated when the internal time of day clock matches a previously User-programmed time.

The communications are done using a protocol called the Z-Wave protocol, a wireless network protocol that was designed especially for home automation applications. It defines how various types of information are to be formatted into frames. These frames not only include commands and data, but also source and destination information, as well as checksums that are used for error detection. The AZM1207-RE US and accompanying application board, the remote control, and other modules make up a wireless local network, where each of the modules can function as wireless repeaters (also half duplex). There is provision within the protocol for intelligent and adaptive routing and for the handling of collisions.

Except for a handful of discrete passive components, the entire transceiver is contained in the ASIC, the ZW0102 made by Zensys. The transmitter and receiver share a common antenna. A SAW filter is used to help minimize receiver overload from strong signals on nearby frequencies and to attenuate any undesired harmonics from the transmitter. The antenna used in the AZM1207-RE US is a wire antenna. There are no external connections to the antenna