Circuit Description for EZ Pro Radio Module 8602

General Description
The 8602 radio module is a 2.4GHz digital spread spectrum frequency modulating hopping transceiver. Operation of the module is controlled by an on-board MCU. The MCU operates at 20.00MHz and controls all radio functions of the TI TRF6900 transceiver chip and Intersil HFA3683 upconvertor / downconvertor based upon the serially issued requests of the host system. MCU-MCU data rate is 9600bps-n-8-1, and radio-radio data rate is 2400bps.

Base
The base module is placed into a listen mode by a serial command and ID set from the controlling system. During this listen mode, the receiver hops around the pseudorandom frequencies within the hop group identified by the ID set, dwelling longer than a typical data packet frame, and will respond to a matching ID set, establishing a connection. The base will return to dwell if the connection is lost or if commanded by the controlling system.

Remote
The remote module is commanded by the controlling system to establish communication by serially issuing a "slave connect" command and an ID set for the module for which it desires communication. The remote will transmit the ID set and additional data indicating that it is requesting a connection. Once connected, the radio will enter a "connected" state and will pass the requested data back and forth.

Radio operation
The ID set defines the overall frequency band the radio will operate in, and will be one of the following: 2454-2465, 2455-2466, 2456-2467, 2457-2468. The 20MHz system clock is upconverted by the PLL in the Intersil part to the base frequencies of 2084, 2085, 2086, or 2087MHz as directed by the MCU. TI TRF6900 generates a frequency of 370.9775MHz to 380.2425MHz as directed by the MCU for transmit or 360.2775 to 369.5425 for receive. During transmit, the MCU directs the TI transceiver to transmit the desired channel number, along with Manchester encoded FM data which is then upconverted by the Intersil device. During receive, the TI device is commanded to 10.7MHz below the transmit frequency of the desired channel. During receive, the incoming RF signals are downconverted by the Intersil device and demodulated by the TI transceiver. The bit recovery and bit sync are performed within the controlling MCU. The packet data contains either data requested by the base or remote system, or connection data to keep the link active and in sync along with the ID set, dotting and error detection bytes. If sync is lost, the base unit will return to a dwell mode and the remote will attempt to re-establish the link.