



TFERFM915 RF Module Circuit Description

RF module 'TFERFM915' is a 900 MHz RF transceiver. The communication between transmitter and receiver is based on direct sequence spread spectrum with different modulation scheme (BPSK & OQPSK) and spreading code. The operation of RF chip and user data can be handled by the on board microcontroller. The transmit power can be set up to 10mW by software setting. The microcontroller's I/O can be assigned by application software. It can be used as LED drive pin, signal I/O pin etc. This RF module schematic is divided into 3 parts, an Antenna circuit, RF Chip circuit and Microcontroller circuit. See Figure 1.

Antenna Circuit

Either an on board antenna (ANT1) or external antenna can be used for this RF module. C11 and L1 are populated for on board antenna and the C12 and CN1 are populated for external antenna. C13 is used for circuit fine tune only. Don't need to populate here.

RF Chip Circuit

The AT86RF212 is a single-chip transceiver. It acts as radio interface between the antenna and microcontroller. T1 is a Combination of 896 MHz Balun and Filter. Frequency band is from 863 MHz to 928 MHz. It can block the other frequency from this band and let the band frequency pass with minimum power lost. The XTAL1 is RF chip external crystal. C3 and C8 are RF chip power supply bypass capacitors. Capacitors C3 and C7 are by pass capacitors for RF chip internal regulators to ensure stable operation. Details of the internal operation see IC specification.

Microcontroller Circuit

The PIC24F16KA102 is 16-bit flash microcontroller. It is mainly used to control the RF chip operation and data transition through the SPI interface and a few I/O pins. SPI pin assignment is listed here.

- P21(RB13) : MOSI
- P18(RB10) : MISO
- P19(RB11) : SCLK
- P22(RB14) : /SEL

And other pins are connected to the edge connector CN2. It is used for the connection between RF module and main system. It is included UART port, In System Programming (ISP) port and other General Purpose Input Output pins.

Figure 1.

