MRF24J40MA MODULE CIRCUIT DESCRIPTION

The MRF24J40MA module is built around the MRF24J40 RF transceiver IC. This IC contains a standard SPI serial data interface to an external data source. The data source will typically be a microcontroller which may also support the application for the product that uses the module. The IC also includes a voltage regulator which provides regulated power to all of the internal circuits on the IC. Bypass capacitors are provided around the IC as needed.

An external crystal at 20.000 MHz generates the clock for all of the digital circuitry on the IC. It also serves as a reference for the frequency synthesizer used to generate the RF carrier. This is the only clock source for the IC.

The transmitter function of the IC takes the data from the external data source over the SPI interface, and creates packets per the IEEE 802.15.4 standard in the baseband processor. It has an RF signal source and modulator to create the 2.4 GHz RF output signal.

The receiver function of the IC takes a signal into the IC and performs a down conversion to base band where the data is taken out of the incoming packets and passed to the external data unit over the SPI interface.

At the RF interface to the IC, an external LC filter is provided to reduce harmonics and to match the impedance to the antenna. The antenna is a printed pattern on the module printed circuit board.

An integrated shield is built into the four-layer PCB. The second layer is a contiguous ground plane to ensure that it does not have to rely upon the shielding provided by the device into which it is installed in order for all modular transmitter emissions to comply with Part 15 limits. It is also intended to prevent coupling between the RF circuitry of the module and any wires or circuits in the device into which the module is installed.