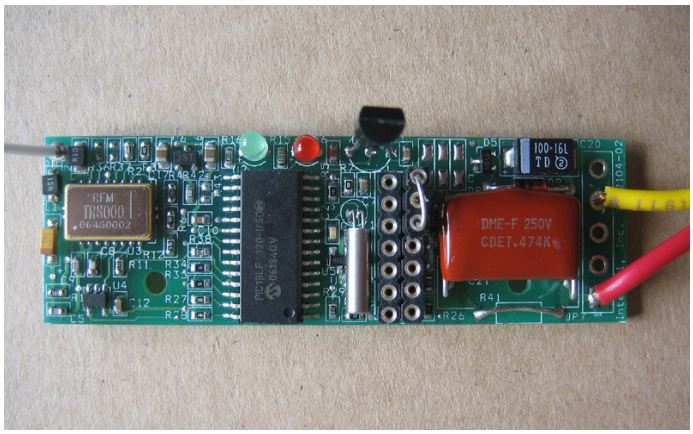
916.5 MHz Transceiver I21RU4A

Technical Description

1. Device Functions

Basic functions of the
916.5 MHz Transceiver I21RU4A:

- Monitoring sensor's signals;
- Transmitting and retransmitting sensors' data within the wireless network.



The Transceiver works on a single 916.5 MHz frequency.
The Transceiver is powered from external 7-11 V DC power supply.

2. Device operation:

The Transceiver contains PIC18LF2320 controller U2 (Oscillator frequency – 4 MHz), which controls RF data communication and scans signals, coming from sensors. The firmware stored in the controller's memory implements the device operation algorithm.
The RF part is based on amplifier-sequenced hybrid transceiver TR 8000 U3.
The transmitter section of TR 8000 employs SAW filtering to suppress output harmonics, facilitating compliance with FCC 15.249 and similar regulations.
The device performs wireless data communications using data packet messages. Each packet contains a number of bytes encoded using 8-bit to 12-bit symbol conversion. The modulation type is selected to be OOK. The Transceiver can operate in either Transmit or Receive Mode.
In Transmit Mode the controller outputs the data to be transmitted through the I/O port line RB2. The red LED D2 indicates operation in Transmit Mode
In Receive Mode the received signal buffered by IC U4 is read through I/O port line RB0. After receiving a packet the device responds by an *acknowledge packet*. Receiving an *acknowledge packet* by the original sender completes a communication cycle. The green LED D3 indicates the completion of the communication cycle.
Voltage regulator U6 converts 7-11V power input into stabilized 3.5V used as VCC voltage for all the ICs. Diode D5 is the protection for polarity reversal. Resistor R40 and zener diode D9 are used for over voltage protection.
The device includes temperature sensor U1. In background mode the controller performs temperature measurement using the built in Analog to Digital Converter (ADC). IC U8 provides 2.5V high precision reference voltage for the ADC.
VPP, RB7 and RB6 pins of the JP3 header are used for the firmware programming.

Additional digital and analog sensors as well as digital inputs of the external equipment can be connected to the Transceiver through pins RA2, RA4, RA5, RC3, RC6R and RC7R of the header JP3.

3. Specifications:

Operating Frequency	916.5 MHz
Modulation Type	OOK
Data Rate	19.2 kbps
Peak Output Power	1.0 mW
Power Supply Voltage Range	7-11 VDC
Current Consumption:	
Receive Mode	7 mA
Transmit Mode	17 mA

4. Testing system configuration:

The 916.5 MHz Transceiver operates as an element of a wireless network. The network has to include one Access Point Device and the necessary number of Transceivers.
A simple system can consist of a Power Source, an Access Point (AP) and one Transceiver. The Transceiver and AP will start to send periodically (about every 8-10 sec) data packets to each other. Flashing red and green LEDs on the Transceiver's board indicates the moments of data exchange between the Transceiver and AP. The communication can be successfully established if the Transceiver is located within 30-70 feet from the AP depending on the environment.