

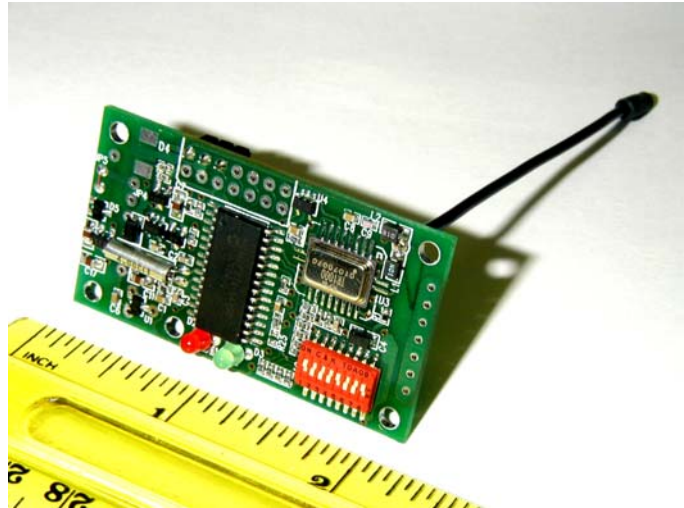
## 916.5 MHz Transceiver Technical Description

### 1. Device Functions

Basic functions of the 916.5 MHz Transceiver:

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

The Transceiver works on a single 916.5 MHz frequency.  
The Transceiver is powered either from 3V battery or from external 5-9V DC power supply.



### 2. Device operation:

The Transceiver contains PIC16LF876 controller U2, which controls RF data communication and scans signals, coming from sensors. The program stored in the controller's memory implements the device operation algorithm.

The RF part is based on amplifier-sequenced hybrid transceiver TR 1000 U3.

***The transmitter section of TR 1000 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 5-9V power input into stabilized 3V used as VCC voltage for all the ICs. Diode D5 is the protection for polarity reversal.

The device includes temperature sensor U1. In background mode the controller performs temperature measurement using the built in Analog to Digital Converter (ADC). IC U5 provides 2.5V high precision reference voltage for the ADC.

Digital and analog sensors are connected to I/O pins RB7, RB6, RB3 RA4, RA5 through header JP3 and are monitored by the microcontroller.

### ***3. Specifications:***

<i>Operating Frequency</i>	916.5 MHz
<i>Modulation Type</i>	OOK
<i>Data Rate</i>	19.2 kbps
<i>Peak Output Power</i>	0.70 mW
<i>Power Supply Voltage Range</i>	5-9 VDC
<i>Current Consumption:</i>	
Receive Mode	10 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 Transceiver with appropriate dipswitch setting can be configured as an Access Point Device. 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 7 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.