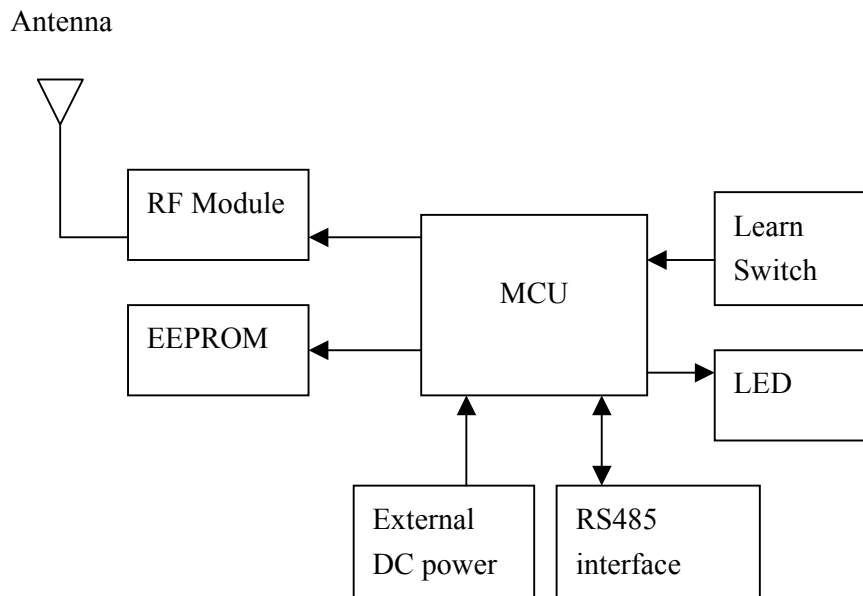


PDA pool/spa wireless remote controller J-box (model 8252) Block Diagram



General Description.

The PDA JBox is part of a wireless remote controller system for transmitting and receiving control signal to and from a PDA handheld device (which is also part of the wireless remote controller system).

The J-Box is acts as an interface to covert RF signals and commands sent by the PDA handheld device to and from RS485 signal. The RS485 interface can be connected to a central station that controls other devices (Heater / Water Pump) in a pool/spa.

Circuit Description.

It works from an external DC Power Supply which is then regulated to a 5V and a 3.3V. It includes an RS485 interface for attaching to other device, an EEPROM for data storage, a Learn Key for initial pairing up of the devices, LEDs for general indication purpose and an RF module. The antenna used is an external mono-pole type antenna matched for application in 915MHz range with a gain of 1.6dBi.

RF Specifications

The RF module employed is an RF transceiver capable of transmitting and receiving RF signals in a Half-duplex manner. The RF uses a dual IF demodulation architecture with IF1 and IF2 at 10.7MHz and 455MHz respectively.

There are 10 frequencies (or channels) of operation in the range of 915-928MHz, see Table 1 for the locations of the centre frequency, f_{centre} , for each frequency. The user can select the operation channel.

The modulation used is Frequency Shifted Keying (FSK) with $\Delta f = 10\text{kHz}$ deviation.

The low side frequency

$$f_0 = f_{centre} - \Delta f$$

represents bit '0' and the high side frequency

$$f_1 = f_{centre} + \Delta f$$

represents bit '1'.

There is only one operation data rate and it is 4kbps. NRZ data format is used, that is, bit '0' will be an RF signal pulse at f_0 with a duration of 250us and a bit '1' will be an RF signal pulse at f_1 with a duration of 250us. The resultant data bandwidth is within 300kHz. Data are sent and received in intermittent data packets of duration less than 200ms.

The RF module normally will be in reception mode. It will periodically transmit data packet. The repetition rate ranges from 2s to 5s and depends on what commands are received via the RS485 interface.

Table 1

Channel Number	Frequency (MHz)
0	920.9
1	921.6
2	922.3
3	923.0
4	923.7
5	915.3
6	916.5
7	917.7
8	918.9
9	920.1