

1 Operating Description

The following block diagram indicates the main building blocks of the Anzacare Wireless Body Fluid Detecting Alarm.

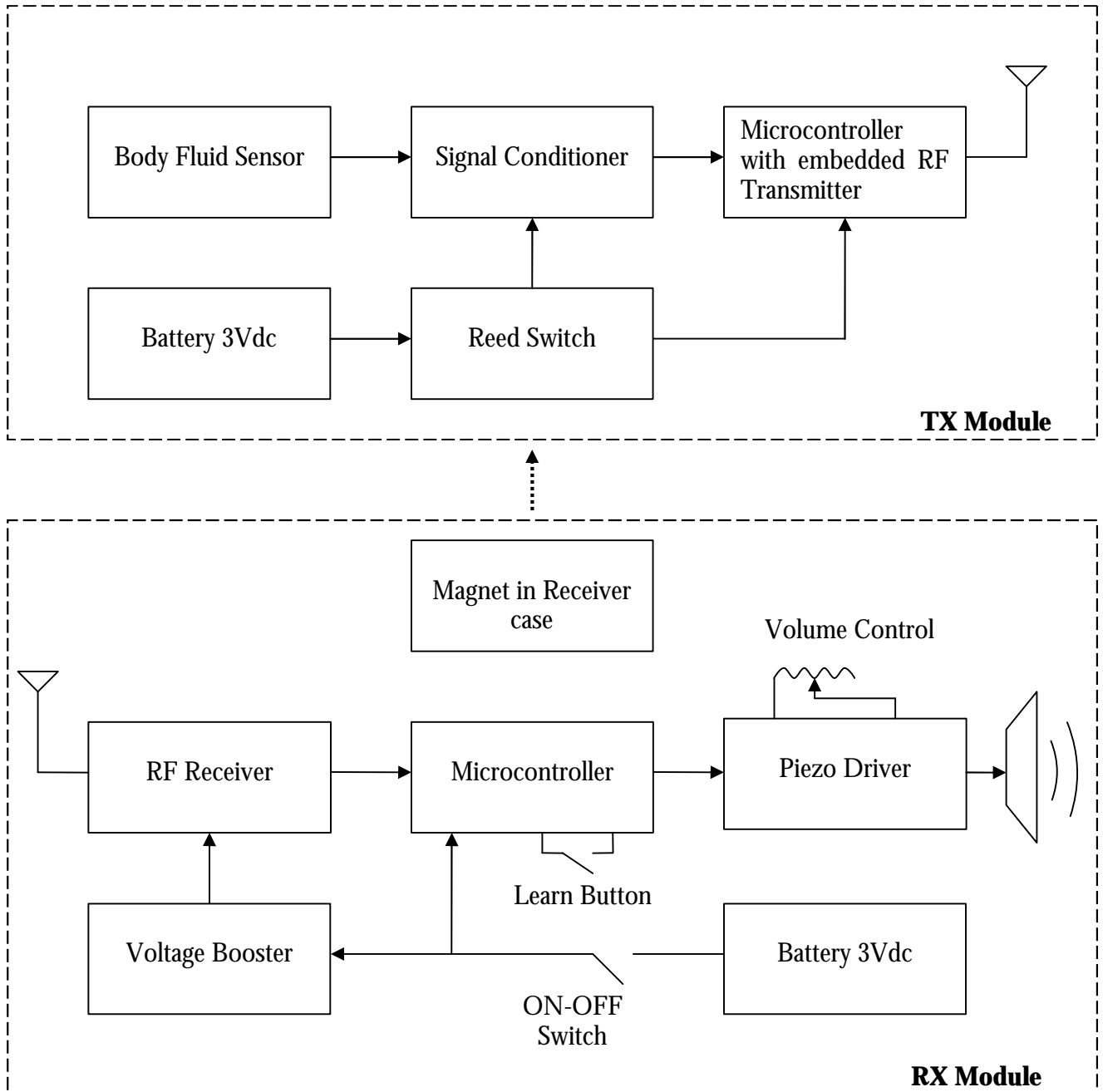


Figure 1-1: Anzacare Wireless Body Fluid Detecting Alarm Block Diagram

1.1 TX Module

The TX module uses an AT86RF401E microcontroller, which belongs to Atmel's AVR series RISC family. This microcontroller has on chip UHF transmitter. The microcontroller can operate from as low as 2V DC. The microcontroller is in-system programmable (ISP) and has 6 general purpose input-output (I/O) pins. One of the I/O pins is connected to the body fluid sensor via a signal conditioner. The microcontroller and the signal-conditioner operate from a 3V lithium coin cell and consumes less than 3uA in power down mode. A reed switch controls battery power to the TX module.

1.2 RX Module

The RX module uses an ATTINY13 microcontroller, which belongs to Atmel's AVR series RISC family. The microcontroller can operate from a voltage as low as 1.8V DC and consumes about 5uA in power down mode. The microcontroller is in-system programmable (ISP). The microcontroller has 6 general purpose input-output (I/O) pins.

The RX module uses Micrel's MICRF009 chip as a UHF receiver. This UHF receiver chip operates in duty cycle mode to conserve power. In the power down mode the receiver chip consumes about 0.15uA current. The receiver chip's output is connected to an I/O pin of the microcontroller. Another I/O pin drives the piezo driver to generate the alarm.

The voltage booster is required to power the receiver chip and the piezo driver. The RX module is powered from a 3 volts lithium coin cell. The ON-OFF switch is provided to disconnect the battery from the RX module and the magnet in the receiver case is used to operate the reed switch on the TX module.

The RX module can be configured to a particular TX module using the learn button.

1.3 Functional Description

The cases for TX & RX modules are designed in such a way that the TX module sits on the RX module when the unit is not in use. In this position the RX module's case-magnet operates the reed switch on the TX module, which puts the TX module in the off state.

The TX module's power turns on when it is not mounted on the RX module. In the power-on state the TX module conserves power by putting the microcontroller in power down mode until wetting of the body fluid sensor activates the microcontroller's I/O pin. This causes the microcontroller to come out of power down mode and to send an RF signal. The transmitted RF signal includes a 32-bit unique ID for that particular TX module. After the RF transmission the microcontroller on TX module once again enters the power-down mode and will not transmit again until the sensor has been dried and subsequently moistened.

The RX module receives the transmitter signal. The UHF receiver chip passes the received 32-bit ID to the microcontroller. The receiver microcontroller compares this ID with the stored ID and turns on the piezo alarm if the IDs match.