

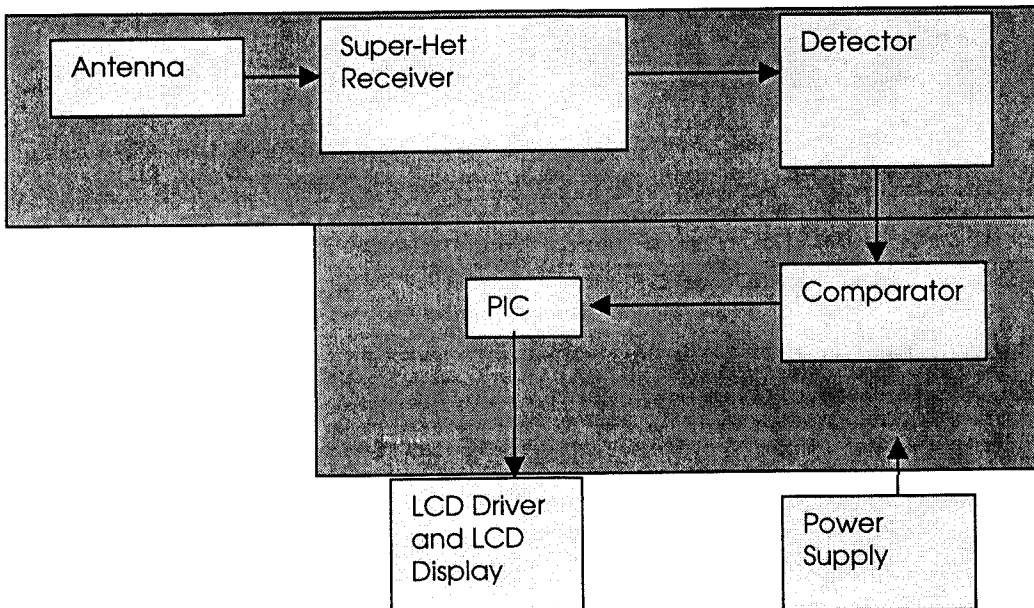
Functionality of the SmartTire wireless tire-monitoring system:

- Continuous monitoring of tire pressure and temperature
- Transmits pressure once / minute
- Transmits temperature once / 1.5 minutes
- Transmits 10 packets of data / 30 seconds (as seen on page 3)
- System consists of 4 sensor transmitters and 1 display module.
- Sensor modules, which are mounted in each tire by means of a stainless steel strap, transmit only when the car is moving above 10 MPH, due to the use of an acceleration switch on the sensor board.
- The display module, which houses the computer and receiver, is mounted on the visor or the dash inside the car and powered via the cars battery (the cigarette lighter)

#### **Technical Description of the 433 MHZ PassCar Receiver**

The SmartTire Passenger Car Tire Monitoring System (TMS) includes a receiver on board the vehicle. The receiver picks-up the wireless signals transmitted from the vehicles tire pressure sensors installed on the wheels. The amplitude-modulated signal is detected here and the corresponding data train is generated which is then deciphered in the PIC. The PIC performs appropriate actions as indicated by the software. The functional block diagram is shown below.

#### **Functional Block Diagram of 433 MHZ Passenger Car Receiver**



### **General Technical Specifications of the Receiver**

Center Frequency of the receiver	: 433.92 $\pm$ 0.1 MHz
12 dBm SINAD sensitivity	: -115 dBm
Receiver Band-width	: $\pm$ 250 kHz (3 dBm)
Receiver RF Emissions	: Within FCC limits < 200 uv/m @ 3 meters
Total DC power Consumption	: 300 mW continuous (25 mA at 12 volts)
Temperature Range	: -40 to 85 °C

### **Theory of Operation**

As can be seen from the block diagram, the radio part comprises of a SuperHet Receiver circuit and detector circuit. The RF signal into the antenna is mixed with an oscillator signal, which converts the signal to an IF signal of 500 kHz. The signal is then passed through a filter and detected. The digital signal is then processed by the PIC.