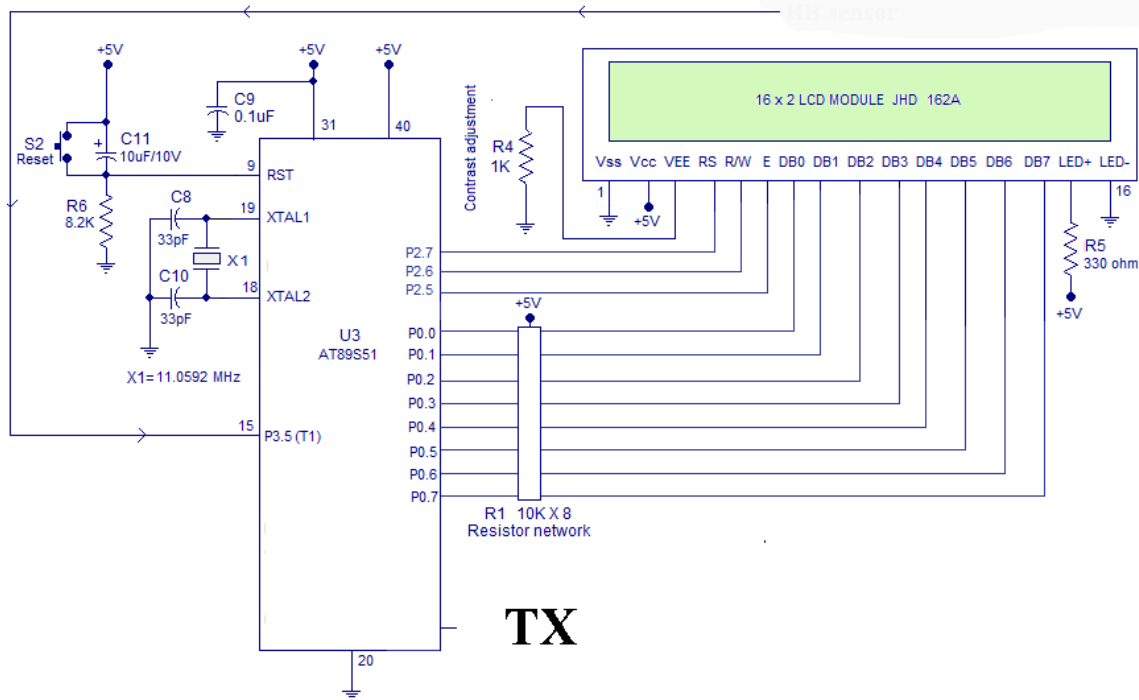


Wireless Heartbeat Monitoring system uses AT89S51 microcontroller, RF transmitter Receiver and IR Heart beat sensor. The device senses the heart rate from the finger tip using IR reflection method and displays it on a LCD display in beats per minute. The circuit has an accuracy of 4 beats per minute and it is very easy to use. In medical terms, the technique used here for sensing heart rate is called photoplethysmography.

Photoplethysmography:

Photoplethysmography is the process of optically estimating the volumetric measurement of an organ. Pulse oximetry, cardiovascular monitoring, respiration detection, heart rate monitoring etc are few common applications of photoplethysmography. Let us have a look at the application of photoplethysmography in heart rate monitoring from the finger tip. When the heart expands (diastole) the volume of blood inside the finger tip increases and when the heart contracts (systole) the volume of blood inside the finger tip decreases. The resultant pulsing of blood volume inside the finger tip is directly proportional to the heart rate and if you could somehow count the number of pulses in one minute, that's the heart rate in beats per minute (bpm). For this an IR transmitter/receiver pair placed in close contact with the finger tip. When the heart beats, the volume of blood cells under the sensor increases and this reflects more IR waves to sensor and when there is no beat the intensity of the reflected beam decreases. The pulsating reflection is converted to a suitable current or voltage pulse by the sensor. The sensor output is processed by suitable electronic circuits to obtain a visible indication (digital display or graph).

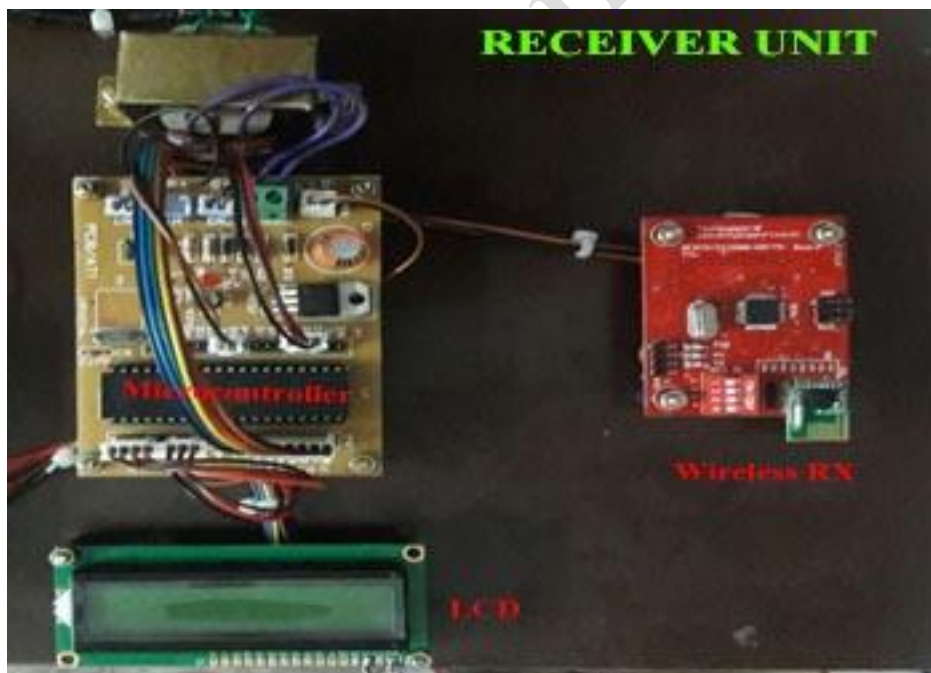
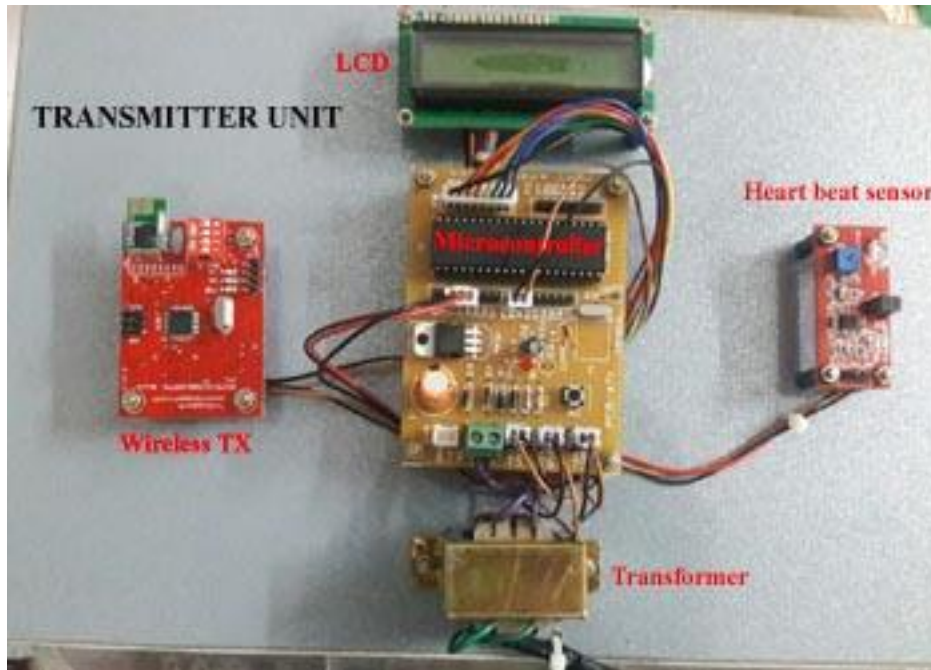


Working of the heart rate monitor

LTH1550-01 photo interrupter forms the photoplethysmographic sensor here. LTH1550-01 is simply a IR diode – photo transistor pair in single package. The front side of the IR diode and photo transistor is exposed and the remaining parts are well isolated. When the finger tip is placed over the sensor the volumetric pulsing of the blood volume inside the finger tip due to heart beat varies the intensity of the reflected beam and this variation in intensity is according to the heart beat.

When more light falls on the photo transistor it conducts more, its collector current increases and so its collector voltage decreases. When less light falls on the photo transistor it conducts less, its collector current decreases and so its collector voltage decreases. This variation in the collector voltage will be proportional to the heart rate. Any way this voltage variation is so feeble and additional signal conditioning stages are

necessary to convert it into a microcontroller recognizable form. whole circuit requires +5V regulated power supply which is served by Power supply unit, comprises of Stepdown transformer, Bridge Rectifier, filter, Regulator (7805).



Features

- Range in open space(Standard Conditions) : 100 Meters
- RX Receiver Frequency : 433 MHz
- RX Typical Sensitivity : 105 Dbm
- RX Supply Current : 3.5 mA
- RX IF Frequency : 1MHz
- Low Power Consumption
- Easy For Application
- RX Operating Voltage : 5V