

LC Meter

Abstract:

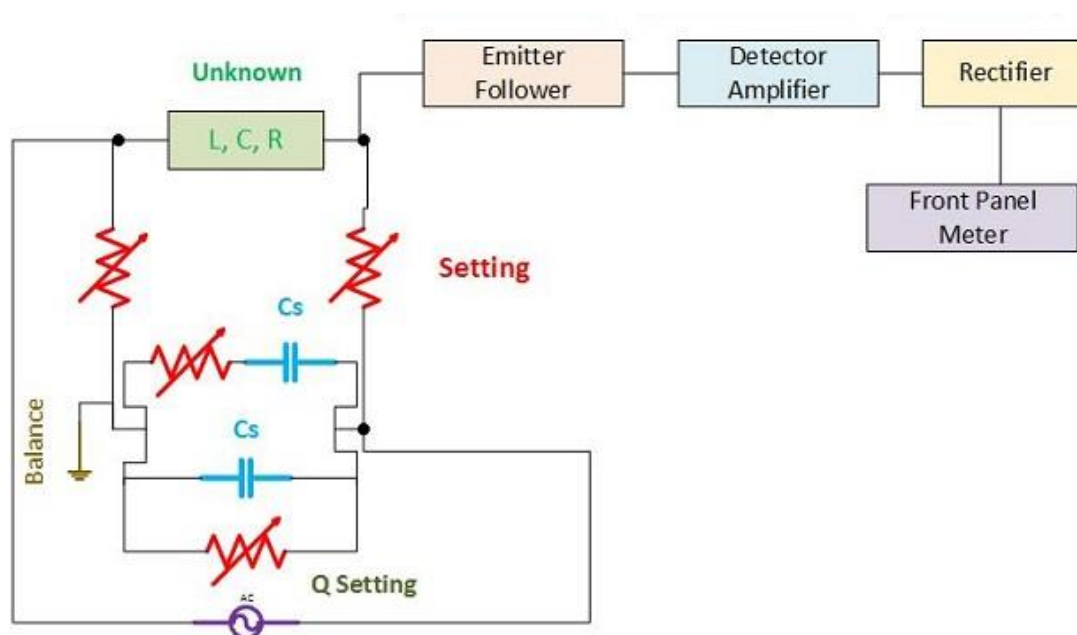
The Inductance-Capacitance (LC) meter is an electronic instrument that can be used for the measurement of the value of unknown inductor or capacitor of a simple coil. This paper aims to discuss the concept and the technique of measuring the unknown inductance and capacitance with the help of a microcontroller board. This meter makes use of the resonance frequency of a tank circuit which consists of a capacitor and an inductor and an unknown inductor or capacitor value connected in parallel. This changes the natural frequency at which the tank circuit resonates. The new frequency depends on the value of inductance or capacitance. The new frequency is determined and the value is calculated with the help of simple mathematical equations. AVR Microcontroller Board has been used to develop this instrument. It consists of an ATmega328p micro-controller chip that facilitates the operation.

Introduction:

LC meter is basically a frequency meter which measures the resonating frequency of a tank circuit. The tank circuit is a general term representing an inductor and a capacitor connected in parallel. This circuit is also called parallel LC circuit, in which the 'L' denotes the inductance and the 'C' denotes the capacitor. A typical LC meter is a wide range LC oscillator. When measuring an inductor or capacitor, the

output frequency changes because of the added capacitor and inductor. Thus, we can calculate capacitance or inductance depending on the requirement by calculating the frequency change.

Block Diagram:



Conclusions:

The LC meter is first designed in Multisim and then Proteus where its functionality is tested. A new library is developed in Arduino IDE to count the number of pulses. The library returns the time period of oscillation. The LC meter is coded and programmed such that it satisfies all the ranges for which it is designed. Upon successful realization, the meter is calibrated and tested for different values of capacitors and inductors. LCD is interfaced with the microcontroller and used for display. The LC meter was accurate with an error of 10%. This LC meter can also be used as frequency meter.