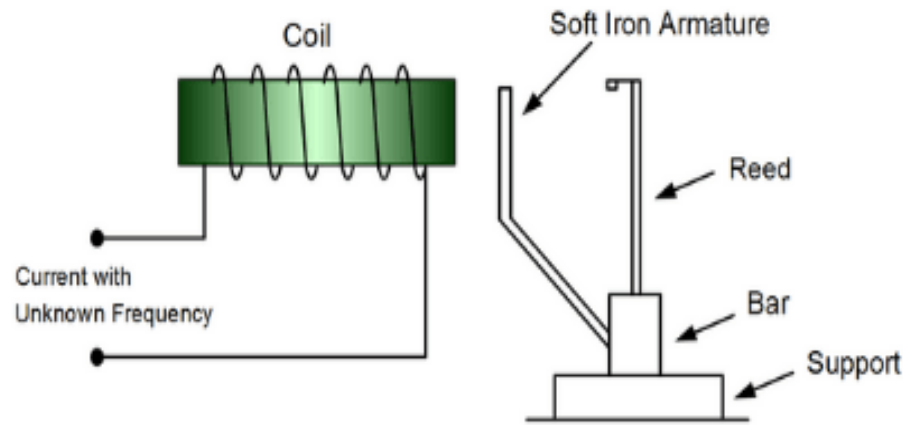


Chapter-10

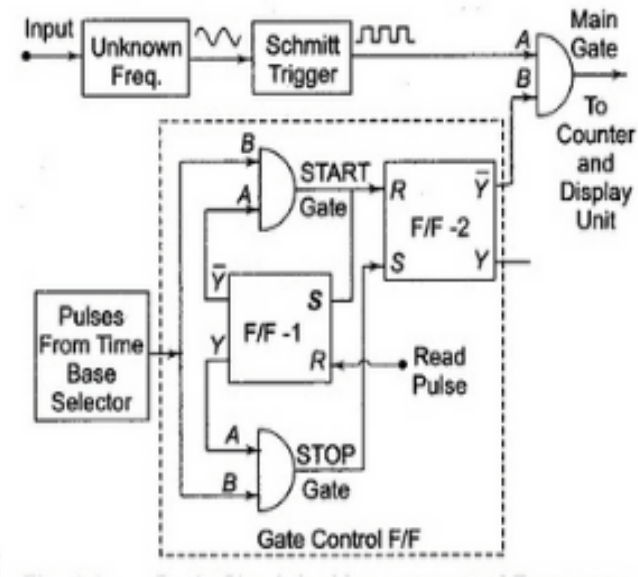
(Understand the construction & working principle of
Digital Frequency Meter)

Lecture-1

What is a Digital Frequency Meter?



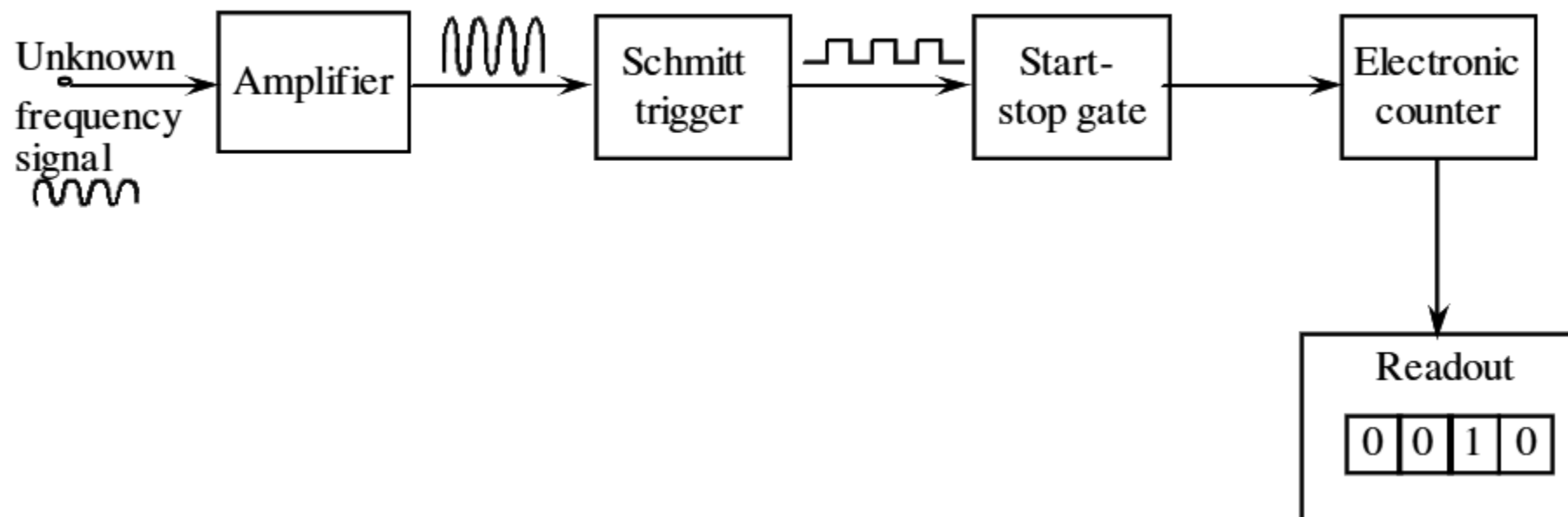
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What is Digital Frequency Meter?

- Digital frequency meter is a general purpose instrument that displays the frequency of a periodic electrical signal to an accuracy of three decimal places. It counts the number events occurring within the oscillations during a given interval of time. As the preset period gets completed, the value in the counter display on the screen and the counter reset to zero. Various types of instruments are available which operates at a fixed or variable frequency. But if we operate any frequency meter at different frequencies than the specified range, it could carry out abnormally. For measuring low frequencies, we usually use deflection type meters. The deflection of the pointer on the scale shows the change in frequency. The deflection type instruments are of two types: one is electrically resonant circuits, and other is ratio meter.



Operating Principle of Digital Frequency Meter:

- A frequency meter has a small device which converts the sinusoidal voltage of the frequency into a train of unidirectional pulses. The frequency of input signal is the displayed count, averaged over a suitable counting interval out of 0.1, 1.0, or 10 seconds. These three intervals repeat themselves sequentially. As the ring counting units reset, these pulses pass through the time-base-gate and then entered into the main gate, which opens for a certain interval. The time base gate prevents a divider pulse from opening the main gate during the display time interval. The main gate acts as a switch when the gate is open; pulses are allowed to pass. When the gate is closed, pulses are not allowed to pass that means the flow of pulses get obstructed.

The functioning of the gate is operated by the main-gate flip-flop. An electronic counter at the gate output that counts the number of pulses passed through the gate while it was open. As the main gate flip-flop receives next divider pulse, the counting interval ends, and divider pulses are locked out. The resultant value displayed on a display screen which has the ring counting units of scale-of-ten circuits and each unit couples to a numeric indicator, which provides the digital display. As the reset pulse generator is triggered, ring counters get reset automatically, and the same procedure starts again.

The range of modern digital frequency meter is between the range from 10^4 to 10^9 hertz. The possibility of relative measurement error ranges between from 10^{-9} to 10^{-11} hertz and a sensitivity of 10^{-2} volt.