Beat-frequency indicator

By using four l.e.ds arranged in a square, this circuit indicates whether an input frequency is above or below a reference frequency by the direction of apparent rotation. The circuit also accepts any shape of input or reference waveforms to give rectangular pulses which the flip-flops divide by two, to produce square waves with mark-space ratios of half the original frequency. These are then gated together to produce a rectangular pulse train whose mark-space ratio changes with the phase difference between the two square waves.

Provided that the input and reference frequencies are above about 50Hz, flashing of the l.e.ds will not be noticeable, and they appear to brighten and dim in sympathy with the changing mark-space ratio. A rotating effect is achieved by arranging the logic to determine which waveform goes low first before each pulse is produced, and then using this to decide which l.e.d. is lit. Rate of rotation will be half the difference between input and reference frequencies. If the rate of rotation is too fast it may be reduced by putting counters between the Schmitt triggers and their respective flip-flops. Input level should be above 200mV pk to pk.

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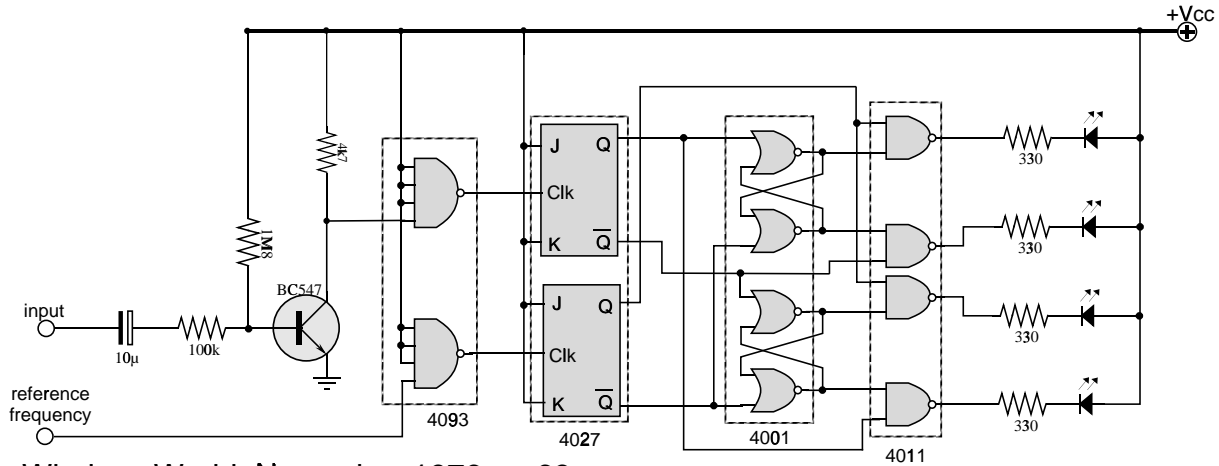
from Wireless World, November 1976, p. 63