

How the Binary counter IC CD 4060 works?

IC 4060 is an excellent integrated circuit for timing applications. Its ten active high outputs can give time delay from few seconds to hours. With a few components, it is easy to construct a simple but reliable time delay circuit.

IC 4060 is an Oscillator cum binary counter cum frequency divider. Its inbuilt oscillator is based on three inverters. The basic frequency of the internal oscillator is determined by the value of the capacitor connected to its pin 9 and that of the resistor in its pin 10. Each output goes high after the completion of the timing cycle. To get maximum time period output Q10 is omitted in the IC itself so that double time is available between Q9 and Q11. Inside the IC there is an oscillator and 14 series connected bistables (Ripple cascade arrangement). Internally the oscillator signal is applied to the first bistable which drives the second bistable and so on. Since each bistable divides its input signal by two, a total of fifteen signals are available, each of half the frequency of the previous one. Ten of these fifteen signals are available on the output pins Q3- Q13. HEF 4060 is CMOS version which can operate at 3 volts while CD 4060 is high voltage type that can operate between 5 to 15 volts. It is necessary to add a capacitor close to pin 16 of IC so that minute voltage changes will not affect the timing cycle. Reset pin 12 resets the timing cycle once it is grounded. Outputs can give almost full supply voltage to drive light loads. Heavy loads such as relay can be operated through a driver transistor. When the high output is connected to the pin 11 (clock input) through a diode, oscillation stops and IC remains latched in high state till it resets. Pin 11 can be used to give clock pulses from an external source.