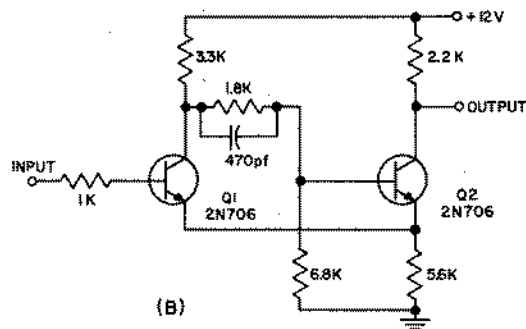


FREQUENCY RANGE 0-500KC
 OUTPUT AT COLLECTOR HAS 8V
 MINIMUM LEVEL CHANGE
 Q1 ALWAYS CONDUCTS IF INPUT
 IS MORE NEGATIVE THAN -5V
 Q2 ALWAYS CONDUCTS IF INPUT
 IS MORE POSITIVE THAN -2V
 AMBIENT TEMPERATURE -55°C
 TO 71°C

(A)



FREQUENCY RANGE 0 TO 1 MC
 OUTPUT AT COLLECTOR HAS 2V
 MINIMUM LEVEL CHANGE
 Q1 ALWAYS CONDUCTS IF INPUT
 EXCEEDS 6.8V
 Q2 ALWAYS CONDUCTS IF INPUT
 IS BELOW 5.2V
 AMBIENT TEMPERATURE 0°C
 TO 71°C

(B)

SCHMITT TRIGGERS
 Figure 7.18

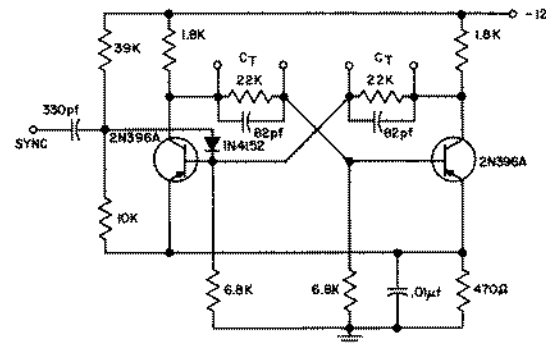
is less than 6.6 volts, Q1 is off as was assumed. As the input approaches 6.6 volts, a critical voltage is reached where Q1 begins to conduct and regeneratively turns off Q2. If the input voltage is now lowered below another critical value, Q2 will again conduct.

ASTABLE MULTIVIBRATOR

The term multivibrator refers to a two stage amplifier with positive feedback. Thus a flip-flop is a bistable multivibrator; a "one-shot" switching circuit is a monostable multivibrator and a free-running oscillator is an astable multivibrator. The astable multivibrator is used for generating square waves and timing frequencies and for frequency division. A practical circuit is shown in Figure 7.19. The circuit is symmetrical with the transistors dc biased so that both can conduct simultaneously. The cross-coupling capacitors prevent this, however, forcing the transistors to conduct alternately. The period is approximately $T = C_T + 100/28.8$ microseconds where C_T is measured in pf ($\mu\mu f$). A synchronizing pulse may be used to lock the multivibrator to an external oscillator's frequency or subharmonic.

MONOSTABLE MULTIVIBRATOR

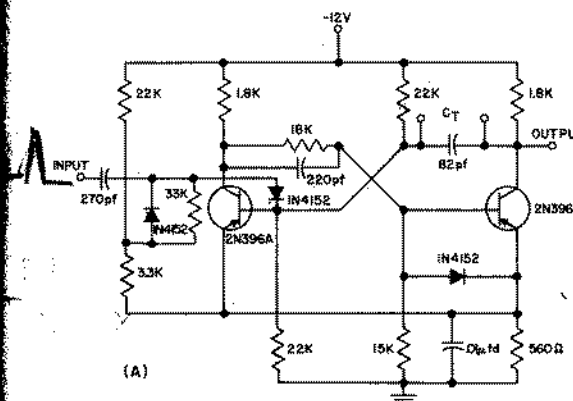
On being triggered a monostable multivibrator switches to its unstable state where it remains for a predetermined time before returning to its original stable state. This makes the monostable multivibrator useful in standardizing pulses of random widths or in generating time delayed pulses. The circuit is similar to that of a flip-flop except that one cross-coupling network permits ac coupling only. Therefore, the flip-flop can



FREQUENCY RANGE 1 CPS TO 250K CPS BY
 CHANGING C_T
 OUTPUT AT COLLECTOR HAS 8 VOLT
 MINIMUM LEVEL CHANGE
 AMBIENT TEMPERATURE -55°C TO 71°C
 SYNCHRONIZING PULSES PERMIT
 GENERATING SUBHARMONICS
 SYNC PULSE AMPLITUDE MUST EXCEED
 1.5V POSITIVE; RISE TIME MUST BE LESS
 THAN 1.0μ SEC.

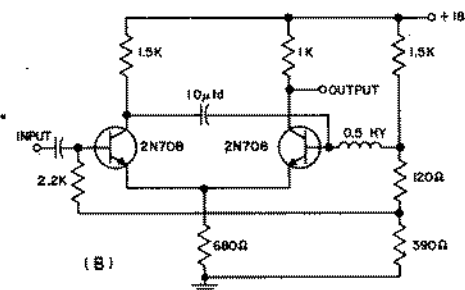
ASTABLE MULTIVIBRATOR
 Figure 7.19

only remain in its unstable state until the circuit reactive components discharge. Two circuits are shown in Figure 7.20 to illustrate timing with a capacitor and with an inductor. The inductor gives much better pulse width stability at high temperatures.



OUTPUT AT COLLECTORS HAS 8 VOLT
 LEVEL CHANGE
 OUTPUT PULSE DURATION 2μ SEC TO 1 SEC
 MAXIMUM INPUT FREQUENCY 250KC
 MAXIMUM REQUIRED INPUT PULSE IS
 5 VOLTS
 DUTY CYCLE EXCEEDS 60%
 AMBIENT TEMPERATURE -55°C TO 71°C

(A)



OUTPUT AT COLLECTOR HAS
 5 VOLT LEVEL CHANGE
 OUTPUT PULSE DURATION APPROX
 600 MICROSECONDS
 MAXIMUM INPUT PULSE REQUIRED
 3 VOLTS
 AMBIENT TEMPERATURE -55°C
 TO 71°C

(B)

MONOSTABLE MULTIVIBRATOR
 Figure 7.20