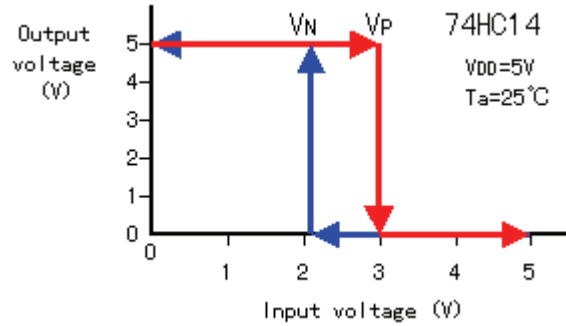
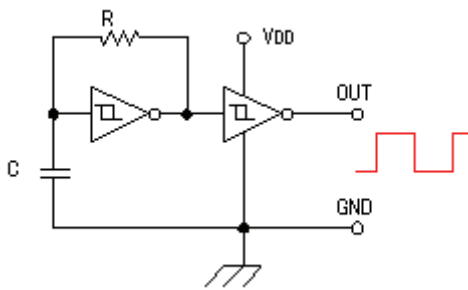


# 各種波形產生器電路

喬治查爾斯電子電路網  
<http://georgecharles.why.to>

## 方波 1:



$$f = 1/T = 1/CR$$

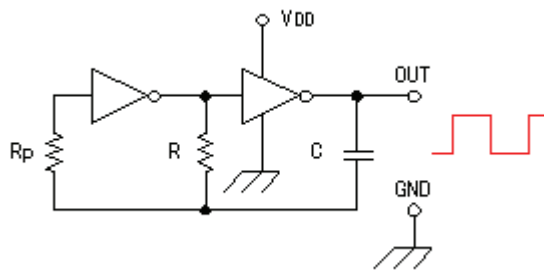
f: The oscillation frequency (Hz)

T: The oscillation period (Second)

C: The capacitor (F)

R: The resistor (ohm)

## 方波 2:



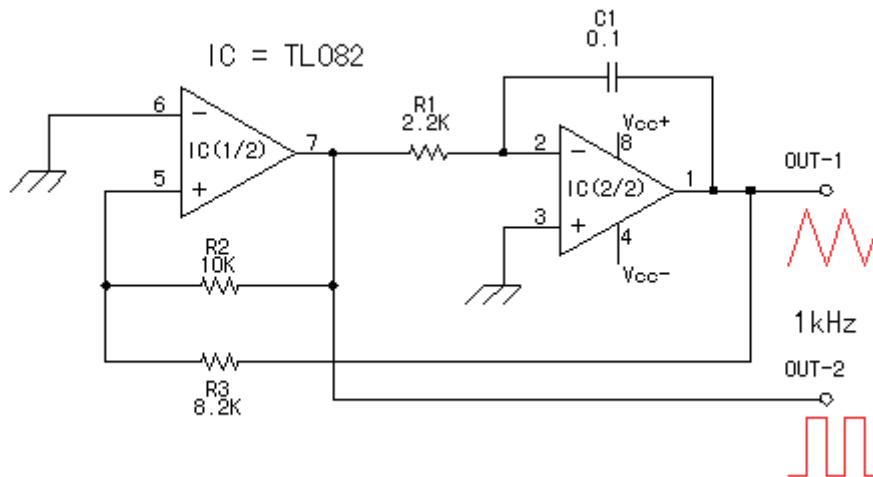
$$f = 1/(2.2CR) \text{ (CD4069)}$$

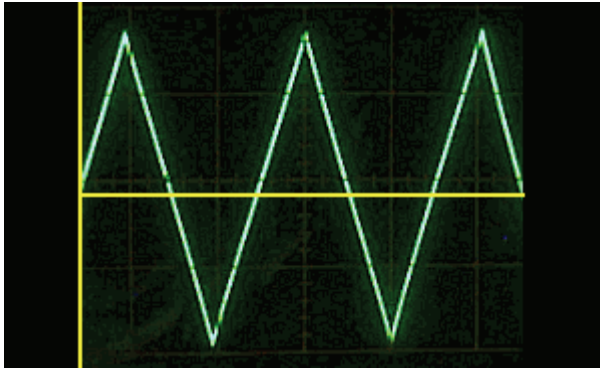
f : The oscillation frequency (Hz)

C : The capacitor (F)

R : The resistor (ohm)

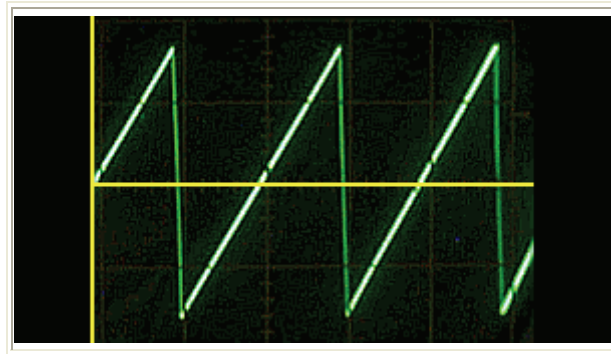
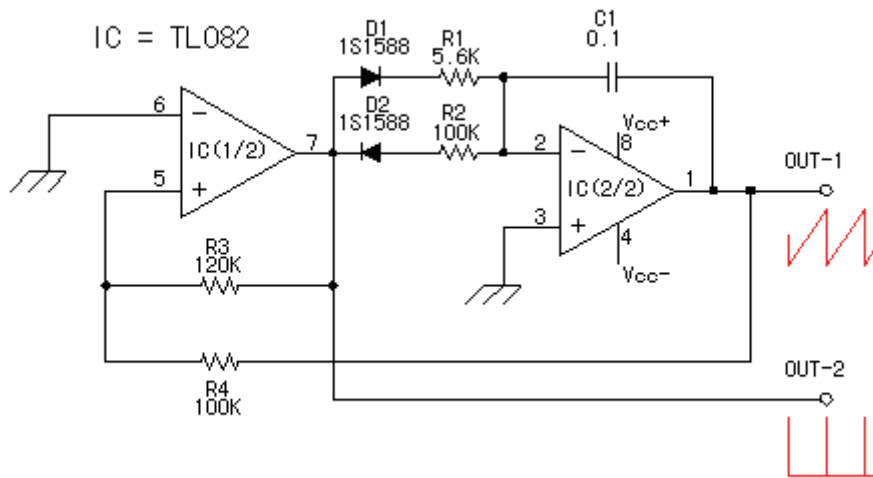
## 三角波:





$$f = \frac{1}{4CR_1} \left( \frac{R_2}{R_3} \right)$$

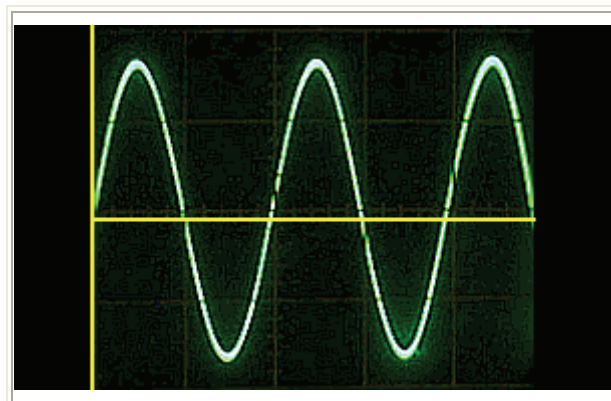
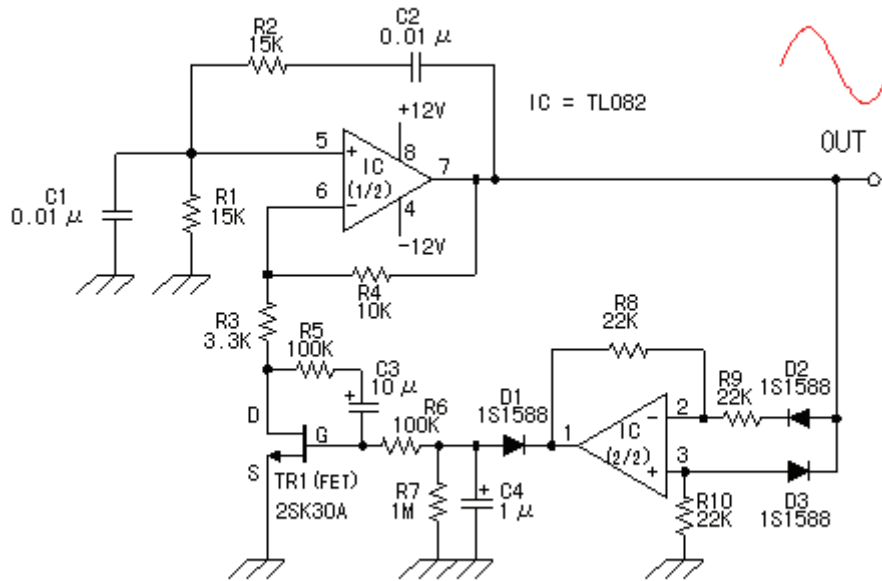
锯齿波:



$$f = \frac{1}{2C(R_1+R_2)} \left( \frac{R_3}{R_4} \right)$$

$$\begin{aligned} f &= (1/2C(R_1+R_2)) \times (R_3/R_4) \\ &= (1/(2 \times 0.1 \times 10^{-6} \times (5.6 \times 10^3 + 100 \times 10^3))) \times (120 \times 10^3 / 100 \times 10^3) \\ &= (1/(21.12 \times 10^{-3})) \times 1.2 \\ &= 56.8 \text{ Hz} \end{aligned}$$

正弦波:

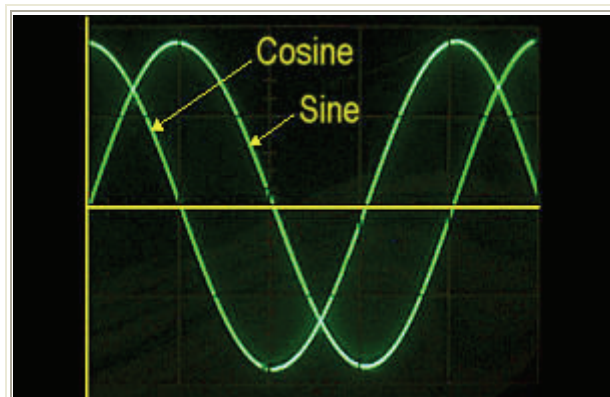
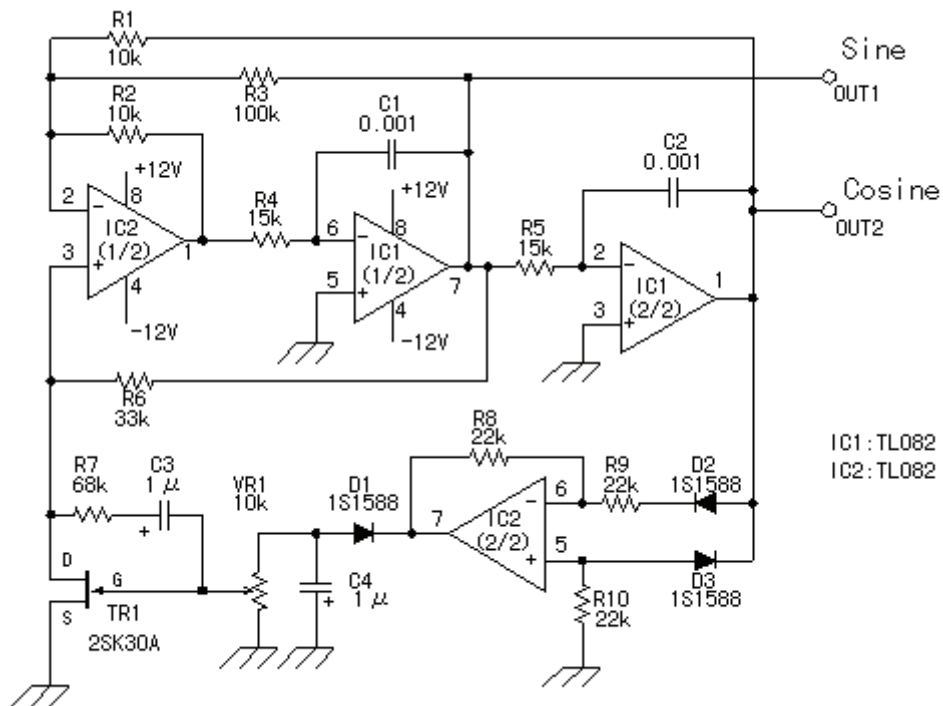


$$f = \frac{1}{2 \pi C \cdot R}$$

The example of the circuit which was made this time is shown below.

$$\begin{aligned} f &= 1/(2 \times 3.14 \times 0.01 \times 10^{-6} \times 15 \times 10^3) \\ &= 1/(0.942 \times 10^{-3}) \\ &= 1.062 \times 10^3 \\ &= 1,062 \text{ Hz} \end{aligned}$$

兩相位弦波：



$$f = \frac{1}{2 \pi C \cdot R}$$

The example of the circuit which was made this time is shown below.

$$\begin{aligned}
 f &= 1/(2 \times 3.14 \times 0.001 \times 10^{-6} \times 15 \times 10^3) \\
 &= 1/(0.0942 \times 10^{-3}) \\
 &= 10.62 \times 10^3 \\
 &= 10.62 \text{ KHz}
 \end{aligned}$$