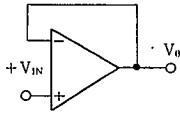
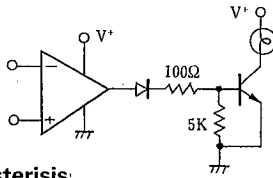


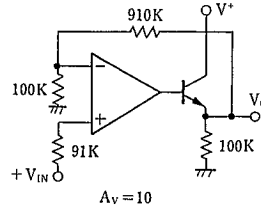
**Voltage Follower**



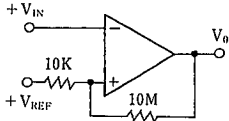
**Lamp Driver**



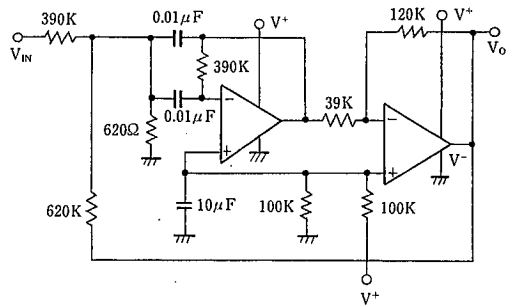
**Power Amplifier**



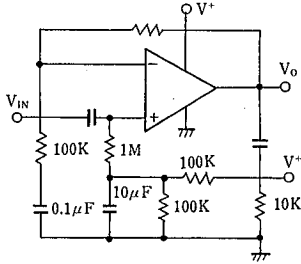
**Comparator with Hysteresis**



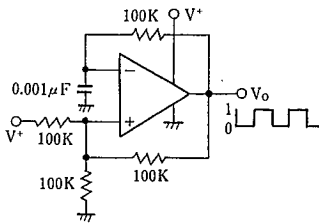
**1KHz Band Pass Active Filter**



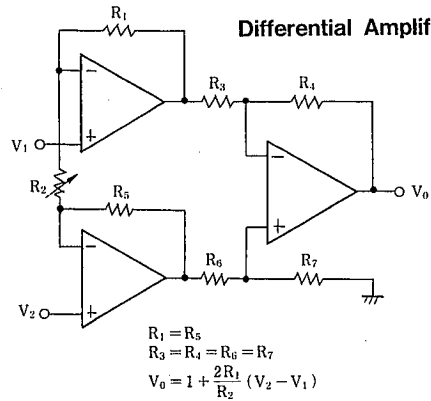
**Non-Inverting Amplifier (AC-Couple)**



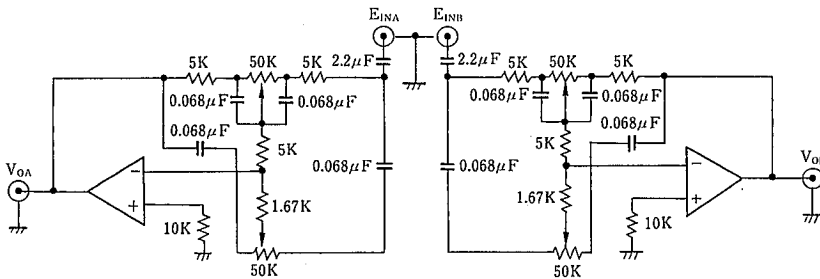
**Square Wave Generator**



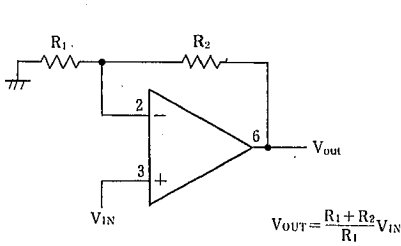
**Differential Amplifier**



**Stereo Tone Control**

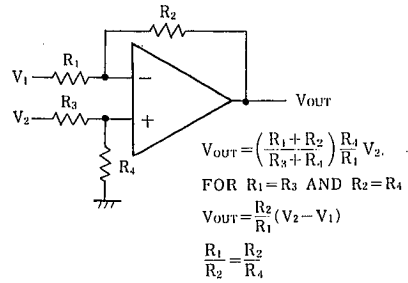


# OP AMP. APPLICATION CIRCUIT



**Non-Inverting Amplifier**

$$V_{OUT} = \frac{R_1 + R_2}{R_1} V_{IN}$$



**Differential Amplifier**

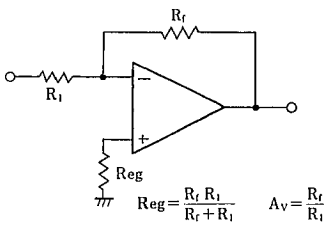
$$V_{OUT} = \left( \frac{R_1 + R_2}{R_3 + R_4} \right) \frac{R_4}{R_1} V_2$$

FOR  $R_1 = R_3$  AND  $R_2 = R_4$

$$V_{OUT} = \frac{R_2}{R_1} (V_2 - V_1)$$

$$\frac{R_1}{R_2} = \frac{R_3}{R_4}$$

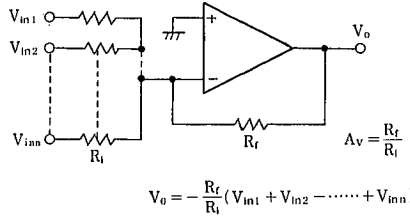
**Inverting Amplifier**



$$A_v = \frac{R_f}{R_1}$$

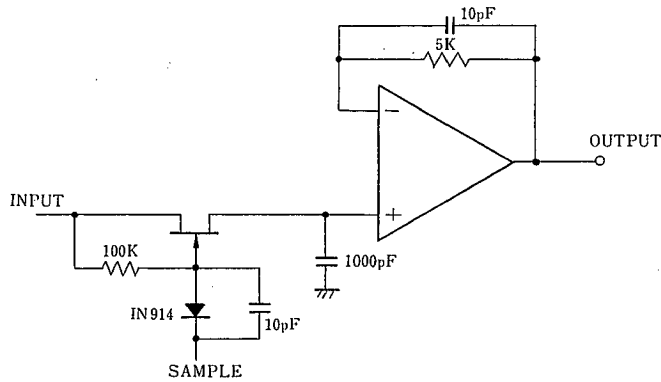
$$R_{reg} = \frac{R_f R_1}{R_f + R_1}$$

**Inverting Summing Amplifier**

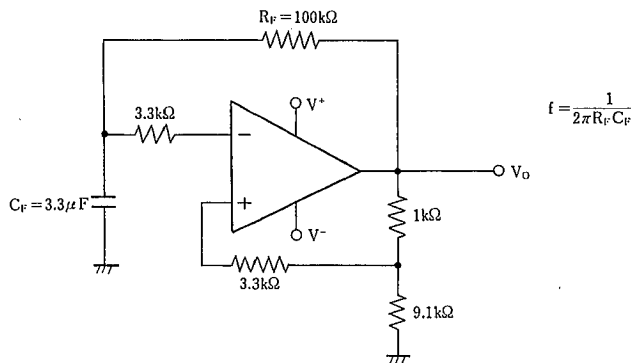


$$V_o = -\frac{R_f}{R_1} (V_{in1} + V_{in2} + \dots + V_{inn})$$

**Sample and Hold**

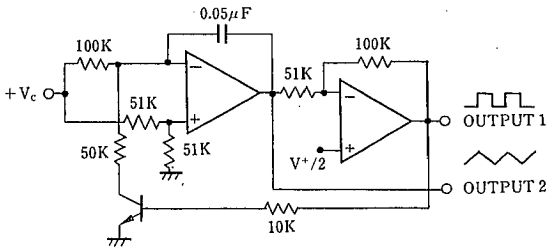


**0.5Hz Square Wave Oscillator**

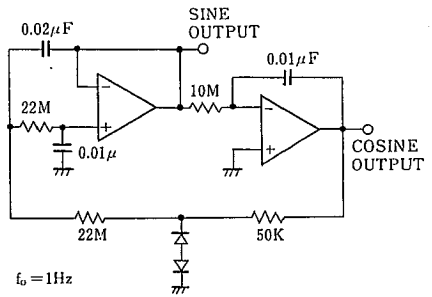


$$f = \frac{1}{2\pi R_f C_f}$$

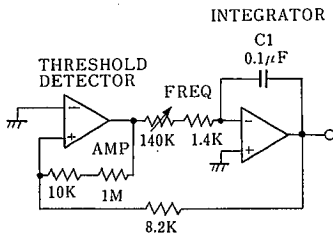
Voltage Control Oscillator (VCO)



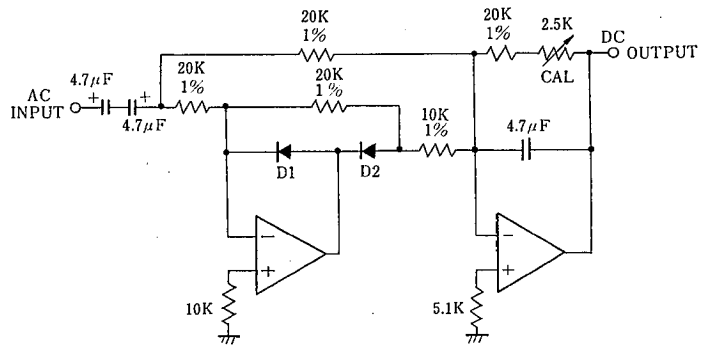
Low Frequency Sine Wave Oscillator



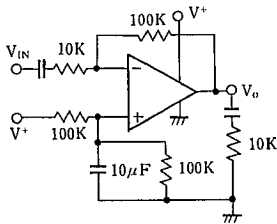
Triangle Wave Oscillator



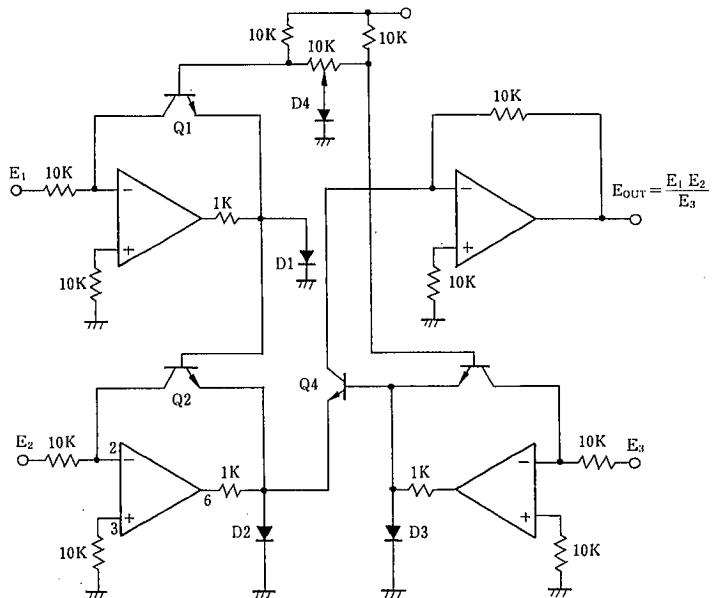
Full Wave Rectifier and Average Filter



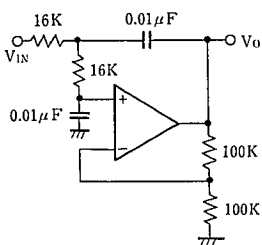
Inverting Amplifier (AC-Couple)



Analog Multiplier and Divider



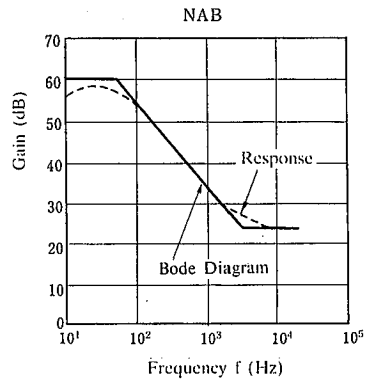
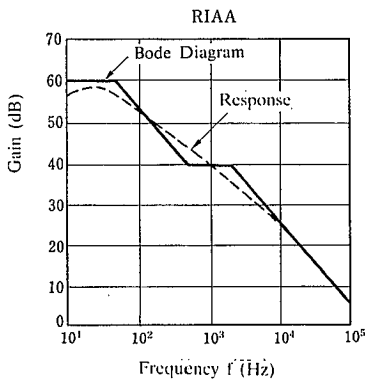
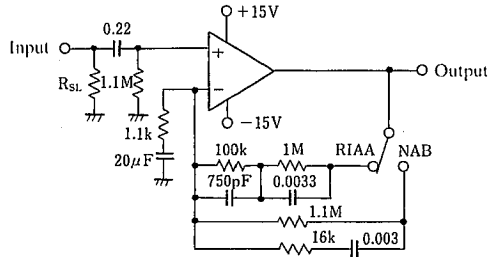
1kHz Low Pass Active Filter



# OP AMP. APPLICATION CIRCUIT

## Preamplifier

RIAA/NAB Compensation



## ■ Rumble/Scratch Filter

