Non Inverting Amplifier

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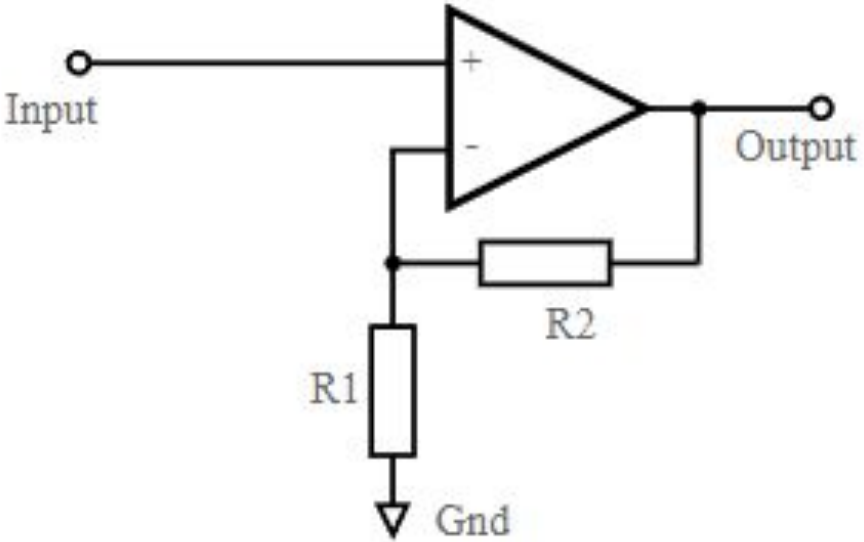
Prater RBT125

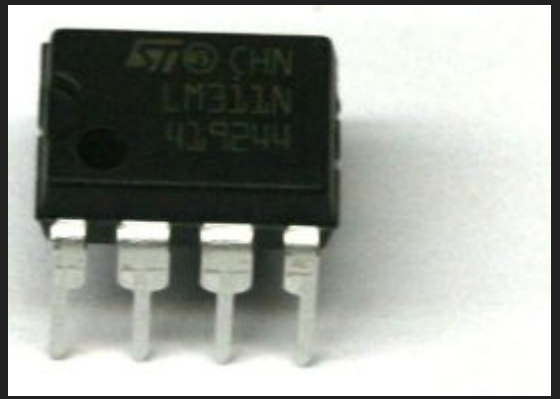
NON-INVERTING OP AMP CIRCUIT

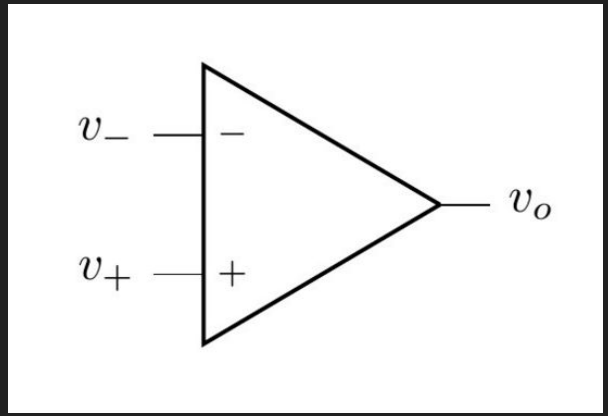


Function

Put simply a Non-Inverting Amplifier is an op-amp circuit which is a high-gain amplifier that has low input impedance and high output impedance.

The circuit’s core centers around the use of a comparator which as the name implies compares the stronger (or rather needed) voltages between 2 one will be represented by a Negative ground signal.





Usages

- It is used to perform mathematical simulation like as its effects on waves
- Used in Audio devices. While a little more uncommon, the rightmost figure demonstrates the need for a non-inverting signal for a 5-10Kilo ohm range via an OpAmp signal.

Both of these op-amp designs offer input impedances in the million megohm range— in comparison with the input impedance figures of 5–10 kilohm, which were typical of early bipolar ICs—and the fact that the input impedance is so high allows the use of such ICs in circuit configurations for which earlier op-amp ICs were entirely inappropriate.

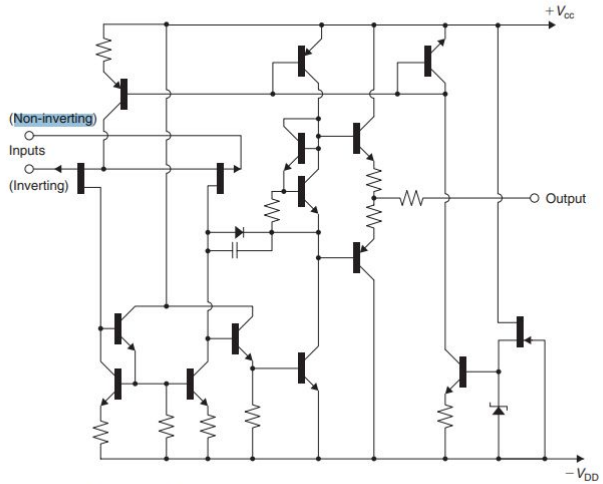


Figure 7.40: Circuit layout of Texas Instruments TL071 op-amp.

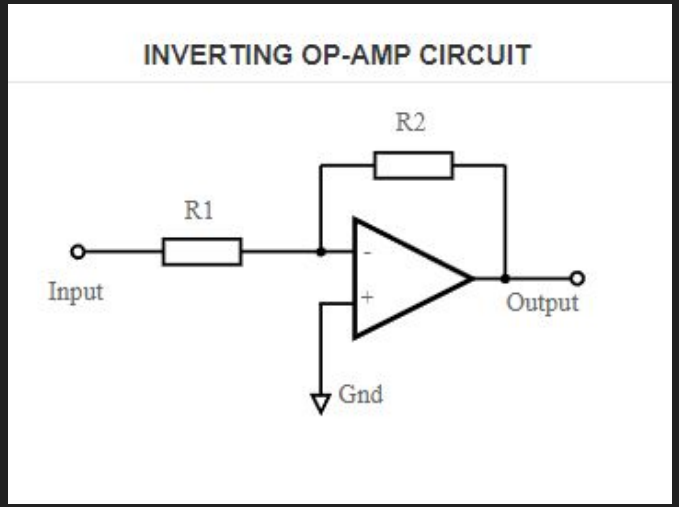
Advantages of circuit compared to others

Non inverting OP amp gain (such as what is used by a NON inverting Amplifiers) is calculated with the formula described to the right.

NON-INVERTING OP AMP GAIN

$$A_V = 1 + R_2 / R_1$$

This formula is advantageous considering it will result in a higher theoretical Gain/Av compared to other circuits such as in the figure to the right. Typically gain is similar but this factor should be considered



Disadvantages of circuit compared to others

Depending on the goal of your circuit a inverting amplifier may be preferable rather than a non-inverting amplifier.

It may be preferable because as the name implies the inverting amplifier inverts or flips the signal so that positive voltage being input represents as a negative going one of the output/ out the other end of the circuit. Vise versa applies as well which is what causes the pulsing in both circuits.

++++ the anti-interference ability is relatively poor.

Variations of the circuit

Many of the variations may utilize

Multiple resistors (more than two)

Or may replace a resistor for a different component as can be seen within the figure the the right

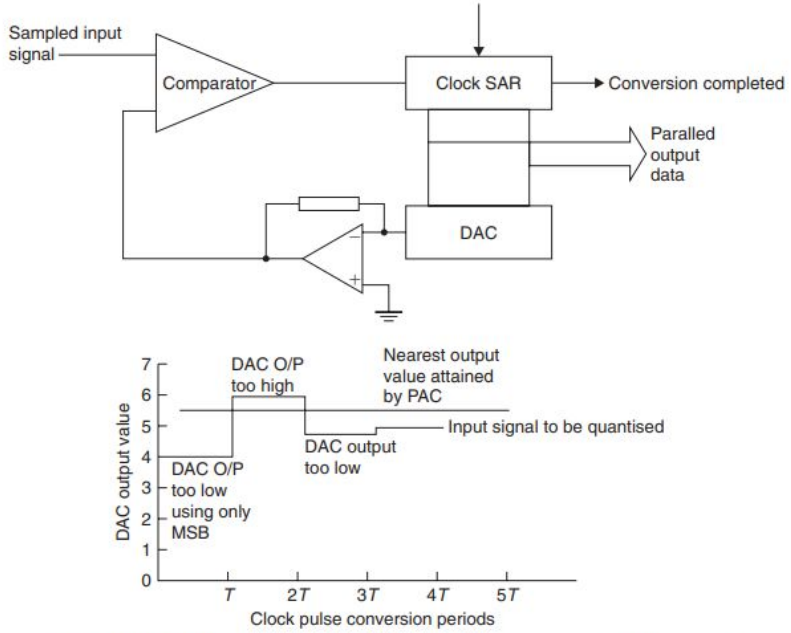


Figure 15.24: The SAR operates with a DAC and a comparator, initially reset to zero. At the first clock period the MSB is set and the resulting output of the DAC is compared to the input level. In the example given here the input level is greater than this and so the MSB value is retained and, at the next clock period, the next MSB is set. In this example the comparator output indicates that the DAC output is too high, the bit is set to 0, and the next lower bit is set. This is carried out until all of the DAC bits have been tried. Thus a 16-bit ADC would require only 17 clock periods (one is needed for reset) in which to carry out a conversion.

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