



Clipping Circuits

The instrument comprises of the following built in parts:

- 1- One DC regulated power supply of 0-3V.
- 2- Different types of resistance and capacitors are provided on the front panel according to the requirement of the circuits as shown in the engraved diagrams on the lab panels **fig(3,4)**.

Theory

Clipping circuits:

The circuit with which the wave form is shaped by removing (or clipping) a portion of the applied wave is known as clipping circuit. Clipper finds extensive use in radar, digital and other electronic systems. Although several clipping circuits have been developed to change the wave-shape. These clippers can remove signal voltages above or below a specified level.

The important diode clippers are:

1- Positive clipper:-

A positive clipper is that which removes the positive half cycles of the input voltage(ideal diode). In a positive clipper circuit, the output voltage has all the positive half cycles removed or clipped off **fig(1)**. During the positive half cycle of the input voltage, the diode is forward biased and conducts heavily. Therefore the



Clipping Circuits

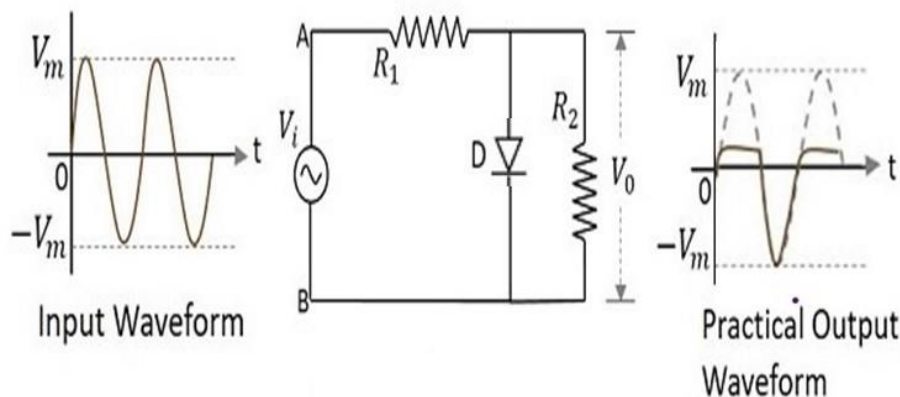
voltage during the half cycles is zero. During the negative half cycle of the input voltage, the diode is reverse biased and behaves as an open. In this condition, the circuit behaves as a voltage divider with an output of

$$\text{Output voltage} = \frac{R_L}{R + R_L}(V_m)$$

Generally, R_L is much greater than R

Therefore output voltage = $-V_m$

Biased and conducts heavily. Therefore, the voltage across the diode (which behaves as a short) and hence across the load R_L is zero. During the positive half cycle of the input voltage, the diode is reverse biased and behaves as an open. In this condition, the circuit behaves as a voltage divider and positive half cycles will appear at the output.

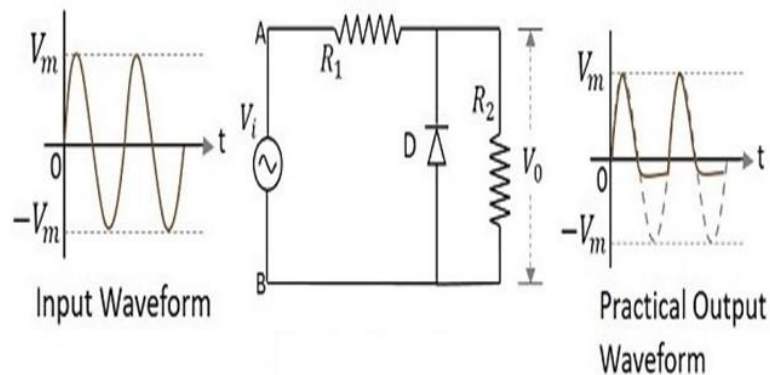


Fig(1). Positive clipper circuit

Clipping Circuits

2- Negative clipper:

A negative clipper is that which removes the negative half cycles of the input voltage (Ideal diode). In a negative clipper circuit, the output voltage has all the negative half cycles removed or clipped off **fig(2)**. During the negative half cycles of input voltage, the diode is forward biased and conducts heavily. Therefore the voltage across the diode (which behaves as a close switch) and hence across the load R_L is Zero.



Fig(2). Negative clipper

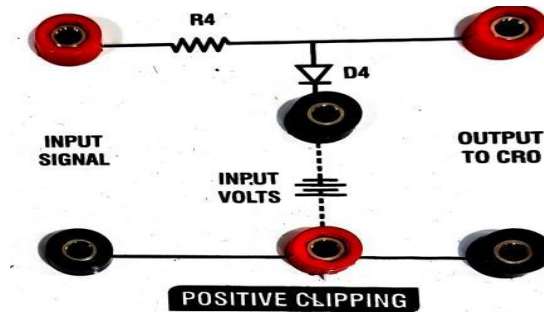
Procedure

For clipping circuits:

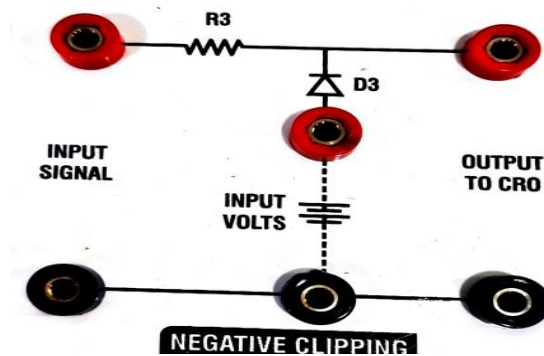
- 1- Apply input signal of 10V P-P, 1 KHz from function generator at input terminals. Also connect CRO at output.

Clipping Circuits

- 2- Switch ON the instrument using ON/OFF toggle switch provided on the front panel.
- 3- Use positive clipper circuit **fig(3)**. Observe the wave-shape at output. We will find that upper part of the sine wave is clipped.
- 4- Use negative clipper circuit **fig(4)**. Observe the wave-shape at the output. We will find that lower part of the sine wave is clipped.



Fig(3). The positive clipping circuit



Fig(4). Negative clipping circuit



Al-Mustaqbal University College
Department of Medical Instrumentation Techniques Engineering
Class: Second
Subject: Measurements & Medical Transducers
Lecturer: Suhair Hussein, F.Diyaaldeen, Shahlaa yaseen
Experiment :2

Clipping Circuits

Discussion:

- 1- What is the relationship between the clipping level and the DC voltage?
- 2- If the variable DC source is reversed, how does this affect the clipping?
- 3- What is the importance of diode?