SUBJECT: BASIC ELECTRONICS

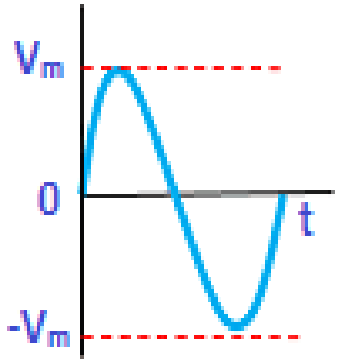
Introduction to Clamper Circuit

Elementrix Classes

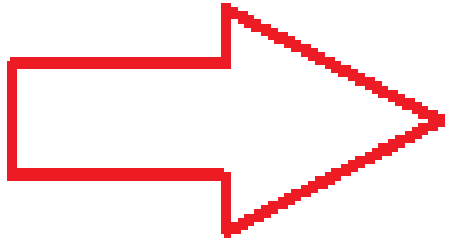
Introduction to Clamper Circuit

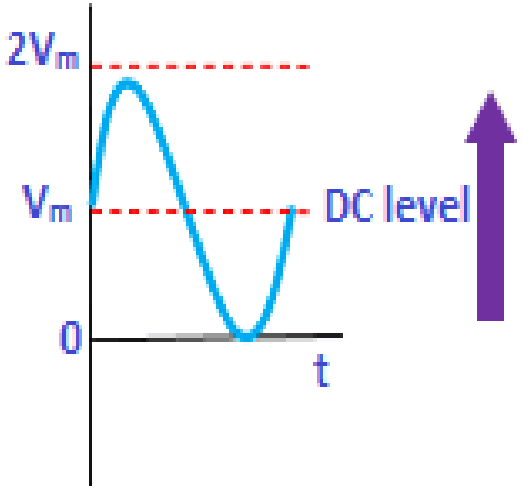
- A clamping circuit is an electronic circuit that shifts the entire waveform of an input signal to a different DC level without distorting its shape. It's also known as a DC restorer or a level shifter.

The term "DC restorer" is commonly used in the context of video signals. In video applications, the transmitted signal is typically an AC-coupled waveform, meaning it does not have a fixed DC component. However, many display devices and processing circuits require a stable DC level for proper functioning. A DC restorer is employed to add or restore this DC level to the video signal.



Input waveform





Output waveform

Need of Clamping

- Clamping a signal is often needed to restrict its amplitude within a certain range. This helps prevent distortion or damage to electronic components by ensuring the signal stays within defined bounds, especially in applications like audio processing or voltage control circuits.

- Imagine an audio signal that fluctuates between -5V and +5V. If this signal needs to be processed by a device that can only handle inputs between 0V and +3V, clamping would be necessary to limit the signal within that acceptable range, preventing distortion or potential damage to the device.

- One common approach is to use a DC offset and scaling. For instance, you could add a DC offset of +5V to shift the entire signal range upwards. This would make the signal vary from 0V to +10V. Then, you could use an attenuator to scale the signal down to fit within the 0V to +3V range.

An offset in the context of signals refers to a constant value that is added to or subtracted from the entire signal. This offset shifts the entire waveform up or down along the vertical axis (voltage axis in the case of electrical signals).

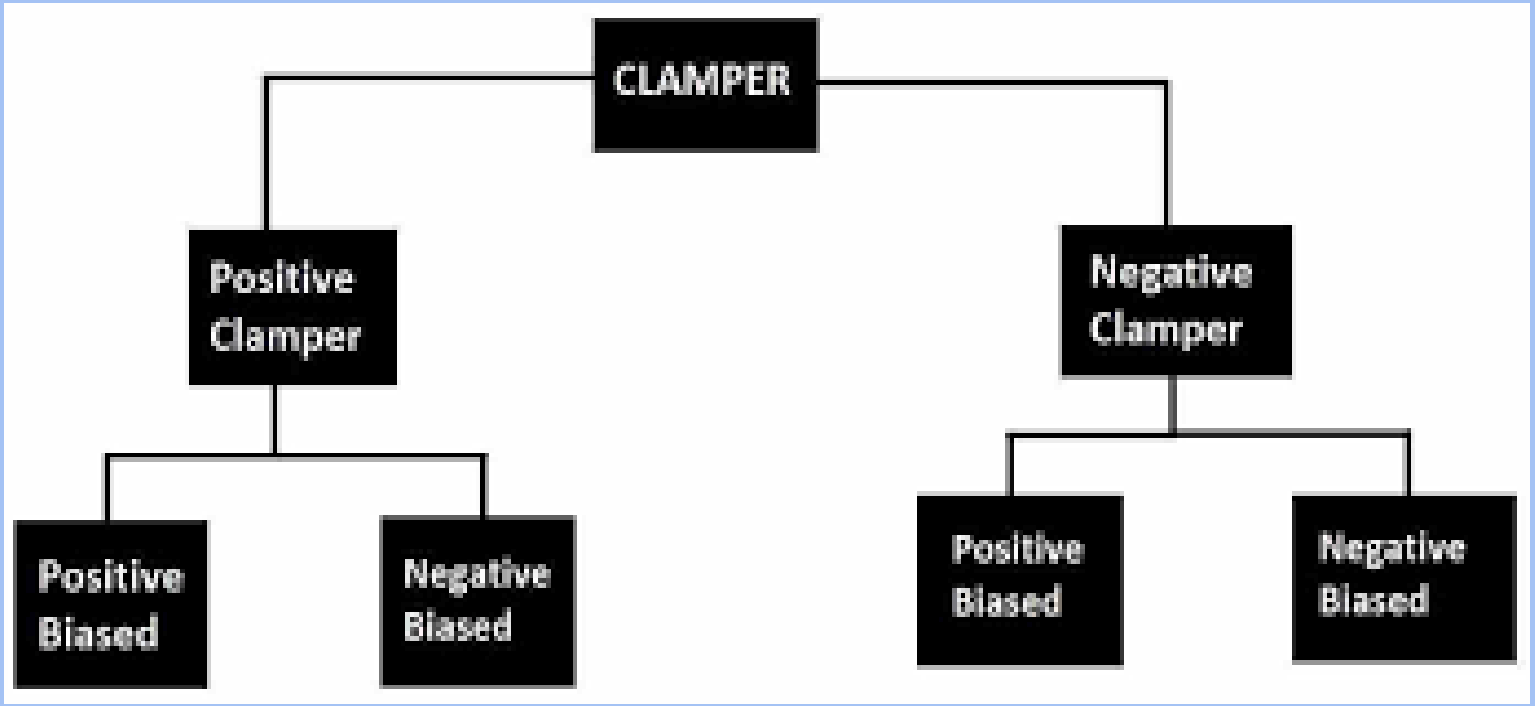
For example:

- If you have a signal ranging from -2V to +2V and you add a DC offset of +3V, the entire signal will shift up, making the new range 1V to 5V.

- Conversely, if you subtract a DC offset of -1V from the original signal, it will shift down, resulting in a range of -3V to +1V.

- Offsets are often used in electronic circuits to ensure that a signal remains within a certain voltage range or to center a signal around a specific voltage level. They play a crucial role in signal conditioning and processing.

Types of Clamper Circuit:



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