* **Demodulation**

During each positive cycle, the capacitor charges up to the peak voltage of

the input signal and then decays slowly until the next positive cycle. The output voltage vo(t), thus, closely follows the envelope of the input. Capacitor discharge between positive peaks causes a ripple signal of frequency wc frequency w in the output. This ripple can be reduced by increasing the c in the output. This ripple can be reduced by increasing the time constant RC so that the capacitor discharges very little between the

positive peaks. Making RC too large, however, would make it impossible for the

capacitor voltage to follow the envelope.

In an envelope detector, the output of the detector follows the

envelope of the modulated signal. On the positive cycle of the input signal, the diode conducts and the

capacitor C charges up to the peak voltage of the input signal. As the input signal falls below this peak value, the diode is cut off, because the capacitor voltage (which is very nearly the peak voltage) is

greater than the input signal voltage, thus causing the diode to open. The capacitor now discharges through the resistor R at a slow rate (with a time constant RC). During the next positive cycle, the same drama repeats. The diode conducts again when the input signal becomes greater than the capacitor voltage. The capacitor again charges to the peak value of this (new) cycle. The capacitor discharges slowly during the cutoff period, thus

changing the capacitor voltage slightly.

The envelope-detector output is vc(t) = A + m(t) with a ripple of

frequency wc The dc term A can be blocked out by a capacitor or a

simple RC high-pass filter. The ripple may be reduced further by

another another (low-pass) RC filter

* **Noise**

In this project, we will build a Simple White Noise Generator Circuit using a single transistor, two resistors, and one Zener diode and Electrolytic Capacitor.

Required Components:

• BC108 transistor.

• 10V Zener diode (1N4740A)

• 68k resistor

• 6.8k resistor

• 4.7uF 35V Electrolytic Aluminium Capacitor

• Three Single berg male header

• Small copper clad board or veroboard

• Soldering iron

• Soldering wire

• Any power supply with an output voltage between 26V to 30.

Use of White Noise Generator:

• White noise has a wide range of usage. It is widely used in Music Production.

• White noise is useful to obtain the impulse response of an electrical circuit. It is a part of Electronics engineering.

• White noise has random frequency thus we can generate random numbers from white noise. It has medical implementation too.

• White noise is used in Tinnitus Treatment. Sound and Acoustic engineers use white noise to balance sound equalization in a concert or other performance venue.

Transistor BC108:

Here is the main transistor. We have selected BC108 for this purpose, another preferable choice is 2N3643. Although any equivalent transistor with the same rating will work fine as expected.

Transistor with TO-18 Metal Can package is very common in electronics compared to typical plastic body found in BC547 or similar. BC108 is an NPN Silicon Planar Epitaxial Transistor with 25v Collector-Emitter Voltage, 30V Collector-Base Voltage and 5V Emitter-Base voltage with 200mA continuous Collector Current.

Working of the White Noise Generator Circuit:

Transistor BC108 is getting the bias current through the 10V Zener diode which is placed in reverse bias with the transistor base. The 10V Zener diode is acting as a Noise source. Other two resistors are connected for current control. The 4.7uf Capacitor is working as a filter capacitor. The circuit needs fairly high voltage to provide noise at the output. We provided 26V as the input voltage of the circuit.

Zener Diode:

Another important component is the Zener diode, which is an essential part of the noise generator circuit. We need to check about the polarity of the diode, otherwise, the circuit will not work.