Inverting Amplifier

In the inverting amplifier only one input is applied and that is to the inverting input terminal. The Non-inverting terminals is grounded. Since V1=0 and v2=Vin.

Therefore V0=-AVin

The –Ve sign indicates that output voltage is out of phase with input by 180degrees.

to the amplifier resulting in the gain of the amplifier now being called its Closed-loop Gain. **s**

This results in the inverting input terminal having a different signal on it than the actual input voltage as it will be the sum of the input voltage plus the negative feedback voltage giving it the label or term of a *Summing Point*. We must therefore separate the real input signal from the inverting input by using an **Input Resistor**, Rin. As we are not using the positive non-inverting input this is connected to a common ground or zero voltage terminal as shown below, but the effect of this closed loop feedback circuit results in the voltage potential at the inverting input being equal to that at the non-inverting input producing a *Virtual Earth* summing point because it will be at the same potential as the grounded reference input.

Inverting Amplifier Circuit

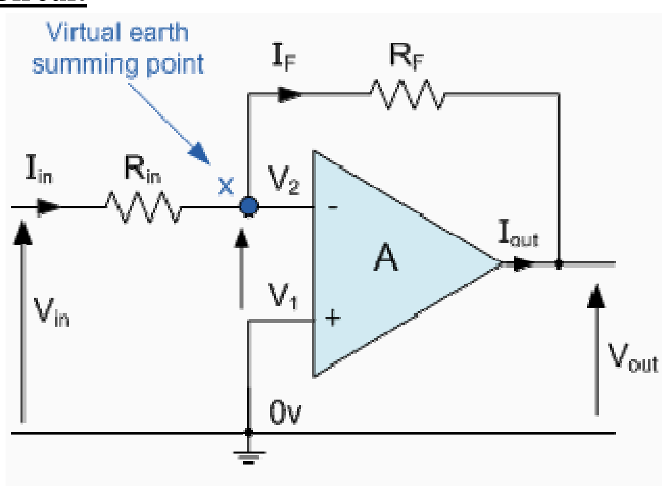

Figure 1.10

In this **Inverting Amplifier** circuit the operational amplifier is connected with feedback to produce a closed loop operation. There are two very important rules to remember about inverting amplifiers is that, "no current flows into the input terminal" and that "V1 equals V2". This is

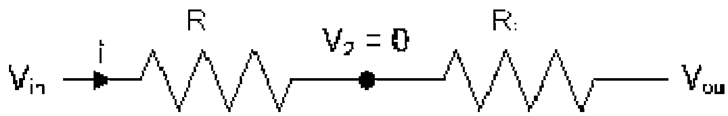

Figure 1.11

$$i = \frac{Vin - Vout}{Rin + Rf}$$

$$\text{therefore, } i = \frac{Vin - V2}{Rin} = \frac{V2 - Vout}{Rf}$$

$$i = \frac{Vin}{Rin} - \frac{V2}{Rin} = \frac{V2}{Rf} - \frac{Vout}{Rf}$$

$$\text{so, } \frac{Vin}{Rin} = V2\left[\frac{1}{Rin} + \frac{1}{Rf}\right] - \frac{Vout}{Rf}$$

$$\text{and as, } i = \frac{Vin - 0}{Rin} = \frac{0 - Vout}{Rf} \qquad \frac{Rf}{Rin} = \frac{0 - Vout}{Vin - 0}$$

$$\text{the Closed Loop Gain is given as, } \frac{Vout}{Vin} = -\frac{Rf}{Rin}$$