Project A
Project Title: Pocket Listening Device

Statement:

Design a pocket listening device that can pick up very faint or remote sounds and amplify them. A spy device can be one of its implementations in the product form as it can pick up sounds with very less amplitude. It can also be used as a hearing aid by partially deaf people. It should be designed in such a way that it maintains a constant level at the output i.e the faint sounds should be amplified and the strong signals to be attenuated to a certain level which is considered to be safe. It should use BJT for amplification and attenuation.

Technical Specifications:

The product should meet the following technical specifications:

a. This product sould be able to integrate a condenser MIC in the design to catch the audio signals present in the environment. The MIC will be given from the ECE Labs having following specifications:
    - Operating Voltage: 2V to 10V (AC will be superimposed on this DC)
    - Current consumption: 1mA (max)
    - Recommended operating voltage: 2V
    - Operating Frequency: 20Hz to 16,000Hz
    - Impedance: <2.2kΩ
b. In the output of the design, one should be able to connect a 3.5mm audio female jack, so that the output can be heard using an earphone.
c. The audio output volume should be controllable from a potentiometer which is connected inside the circuit board at a suitable stage
d. The output level should be such that, it can be fed to an 3.5mm earphone, which are normally used. The design requirement should include the fact that, a maximum of 300mVrms and 1.3mA of current can be allowed to pass through the earphone.
e. The design may or may not include a filter, so as to suppress the noise outside the audio band. However, in the output a reasonable SNR should be maintained.

Restrictions:

a. The amplification and attenuation part(for output level control) should be implemented using BJTs/MOSFETs, use of op-amps are NOT allowed for this purpose.
b. Students can use active and passive filters as per their requirements.
