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| **Course Name:** | **Linear Integrated Circuits and Design** | **Semester:** | **V** |
| **Date of Performance:** | **18/11/2021** | **Batch No:** | **B1** |
| **Faculty Name:** | **Prof. Milind Marathe** | **Roll No:** | **1912052** |
| **Faculty Sign & Date:** |  | **Grade/Marks:** | **/25** |

**Experiment No: 10**

**Title: Op Amp 741 based circuit ( Earthquake Detector using IC741 )**

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| **Aim and Objective of the Experiment:** |
| To implement and analyze Earthquake Detector using IC741   * To study and understand operation of Earthquake detector. |

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| **COs to be achieved:** |
| **CO2:** Design circuits for Earthquake detector using IC741. |

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| **Theory:** |
| **Earthquake detector are very important as no one can’t ignore natural laws in spite of the many developments in science and technology. Nature has forced the scientific community to assume or predict some natural warnings. Earthquake is one among the foremost damaging natural activities which supply serious threat to areas close to major active faults toward land or geologic process zones offshore. Earthquake happens thanks to the fulminate unharnessed of huge quantity of energy from the earth’s crust. Thanks to this energy earth generates some damaging waves referred to as unstable wave. It’s been found that the unstable waves embrace shear wave, longitudinal wave and surface wave. The longitudinal wave and shear wave also are referred to as P-wave and S-wave severally. Out of all waves surface wave is that the most damaging in nature, however the speed of the surface wave is slower than the opposite waves. The P-wave’s vibration direction and therefore the advancement square measure found to be same that is that the quickest in nature among the all waves. However, the damaging force of P-wave is found to be low. The S-wave’s vibration is perpendicular to the forward direction, whose speed is under P-wave however the damaging force is high.**  ***Purpose of this Project:***  **Early Earthquake Warning system is one among the helpful developments to avoid wasting human lives. EEW detects the P-waves and generates warning because the most damaging S-wave follows the P-wave. It’s been reportable that some countries have already enforced EEW to rectifying earthquake hazards. But still several countries don’t have EEW, because the price of implementation is simply too high. For those countries there should be some low price earthquake warning device to avoid wasting human lives. The design of low cost earthquake warning component which can be get by folks in their home to avoid wasting their lives at the time of earthquake. If the acceleration of the unstable wave is bigger than the predefined price, the system blows the alarm. This method may be utilized in multistory building because the alarm is connected wirelessly.** |

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| Components Required for this Circuit: |
| **IC 741**  **IC 555**  **BC 548 (NPN Transistor)**  **Battery**  **Capacitor**  **Capacitor-Electrolytic**  **LED**  **POT-HG (Potentiometer)**  **RES (Resistor)**  **Speaker** |

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| **Circuit Diagram:** |
| **Earthquake detector using IC 741** |

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| **Circuit Design OF Earthquake Detector :** |
| The main part of this project is IC 741(Op Amp) and IC 555(Timer) It consists of eight pins. Its three and seven pins area unit connected with earthquake alarm and for indicate the vibration we have a tendency to use a diode. Conjointly resistance and capacitance area unit connected with alarm. On the opposite hand pin two and four area unit connected with NPN semiconductor device and conjointly with potentiometer to envision its speed. |

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| **Working OF Earthquake Detector :** |
| The structure of wireless Earthquake warning component which includes one transmission half and one receiving element. The transmission half includes the measuring instrument created by Analog Devices, which might sight the vibration produces thanks to earthquake. This half combined includes a 555 timer to method the prices obtaining from transistor and generates a symptom once the bottom acceleration is bigger than the brink value. The signal generated by the controller is then send to the receiving half. |

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| **Waveform:** |
| ***Earthquake detector when it does not detects the earthquake signal :***  Earthquake detector using IC 741.PNG output 1  ***Earthquake detector when it detects the earthquake signal :***  Earthquake detector using IC 741.PNG output |

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| **Benefits of Earthquake detector:** |
| Earthquake early warning (EEW) is the rapid detection of earthquakes underway and the alerting of people and infrastructure in harms way. Public warning systems are now operational in Mexico and Japan, and smaller‐scale systems deliver alerts to specific users in Turkey, Taiwan, China, Romania, and the United States. The warnings can arrive seconds to minutes before strong shaking, and a review of early warning applications around the world shows this time can be used to reduce the impact of an earthquake by many sectors of society. Individuals can use the alert time to drop, cover, and hold on, reducing injuries and fatalities, or if alert time allows, evacuate hazardous buildings. Train derailments can be reduced, chemical splits limited, patients in hospitals protected, fire ignitions prevented; workers in hazardous environments protected from fall/pinch hazards, reducing head injuries and/or death. |

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| **Conclusion:** |
| Through this project we have developed a earthquake detector using the IC 741 and also with the help of IC 555. This project has several blessings like low value and low power consumption . As mentioned earlier it will be utilized in high-rise building with several receiving give up single sending half so it can detect the earthquake and alert the people who are living in that building. |

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| **Signature of faculty in-charge with Date:** |