Electronics and Medical Devices

Team Activity 2

Team Members :
(Group 4)

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Thermometer

Thermometer:

- An instrument used for measuring the temperature.
- Contains a narrow, concealed glass tube containing alcohol or mercury.
- When temperature increases, mercury increases, thus indicating rise in temperature and measuring the heat of the body.
- It is mainly of two types:

  -laboratory thermometer

  -medical thermometer

Types of Thermometer

1. **Laboratory Thermometer**:
- Used in laboratories to measure the hotness or coldness of an object used in the experiment.
- Mercury thermometers are widely used here.
2. **Medical Thermometer:**
- Used for medical purposes, mainly for measuring the body's temperature.
- Mercury thermometers are used .
- Used in various ways and in various parts of body(armpit, oral, rectum, and ear).

Types of Thermometer

3. Electronic thermometers:

- It detects temperature changes using a thermoresistive device in which the **electrical** resistance changes in response to changes in temperature.
- This device may be a thermistor or a thermocouple and is incorporated into the tip of a probe.
- The information captured is sent to a microchip that processes it and gets displayed numerically on the digital screen.
- They are easy to use, inexpensive, and accurate.
- Digital thermometers can be considered to be advanced thermometers that are used for measuring body temperature.

Other types of Thermometer:

- Mercury-in-glass thermometer
- Clinical thermometer
- Digital thermometer
- Rotary thermometer
- Resistance thermometer
- Liquid crystal thermometer
- Infra-red thermometer

Electronic Thermometer

# Working of Electronic Thermometer

Electronic thermometers detect temperature changes. The voltage drop across the diode changes with a change in temperature. At room temperature, the voltage drop across the diode is 0.7V and reduces at the rate of 2mV/degree Celsius. This voltage change is sensed by the operational amplifier. The output of the operation depends upon the voltage drop across the diode.
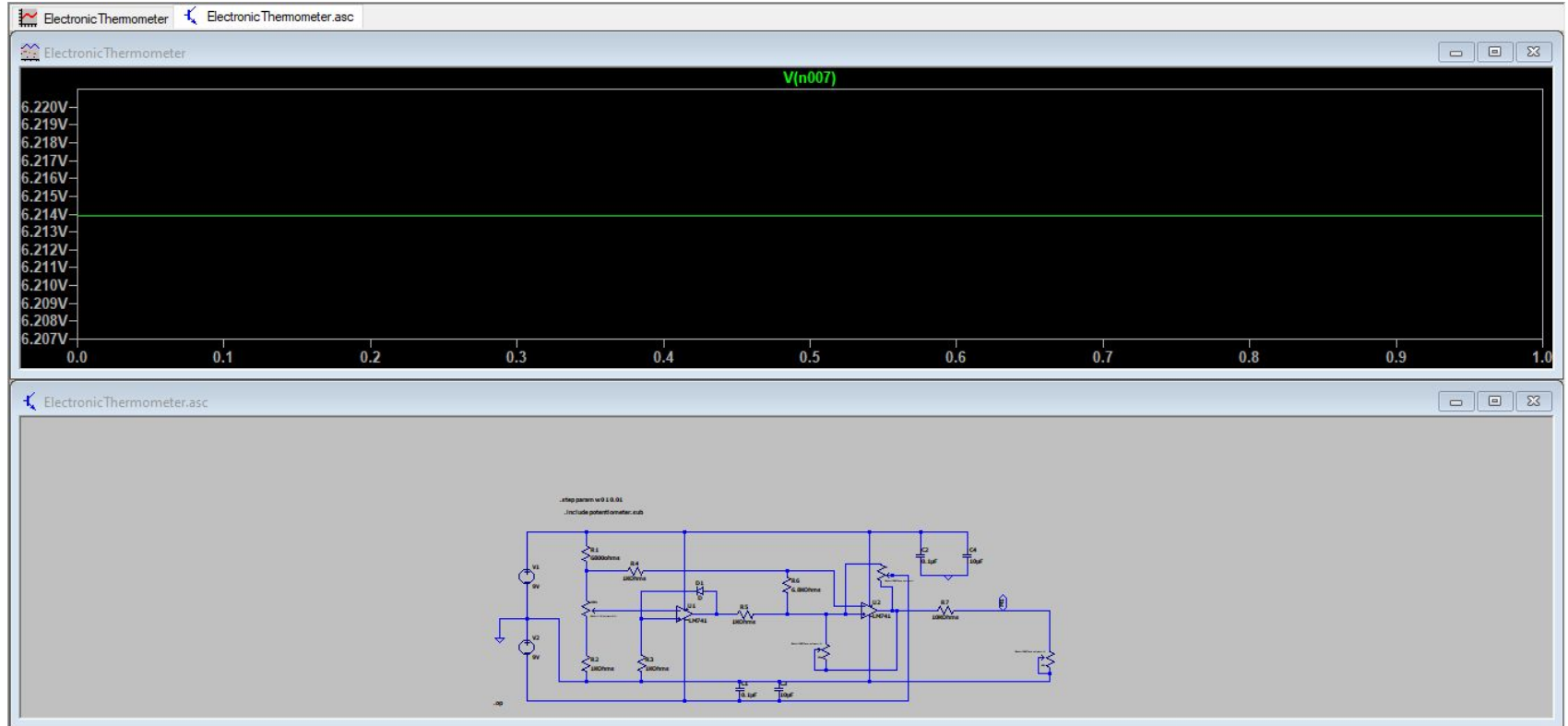
Components:

Components	Value
R1	6800 Ohms
R2,R3,R4,R5	1K Ohms
R6	6.8K Ohms
R7	10K Ohms
VR1	2.2KOhms
VR2,VR3,VR4	10K Ohms
C1	01.uF
C2	0.1uF
C3	10uF
C4	10uF
M1	Ammeter
OPAMP	uA741
Diode	IN4148

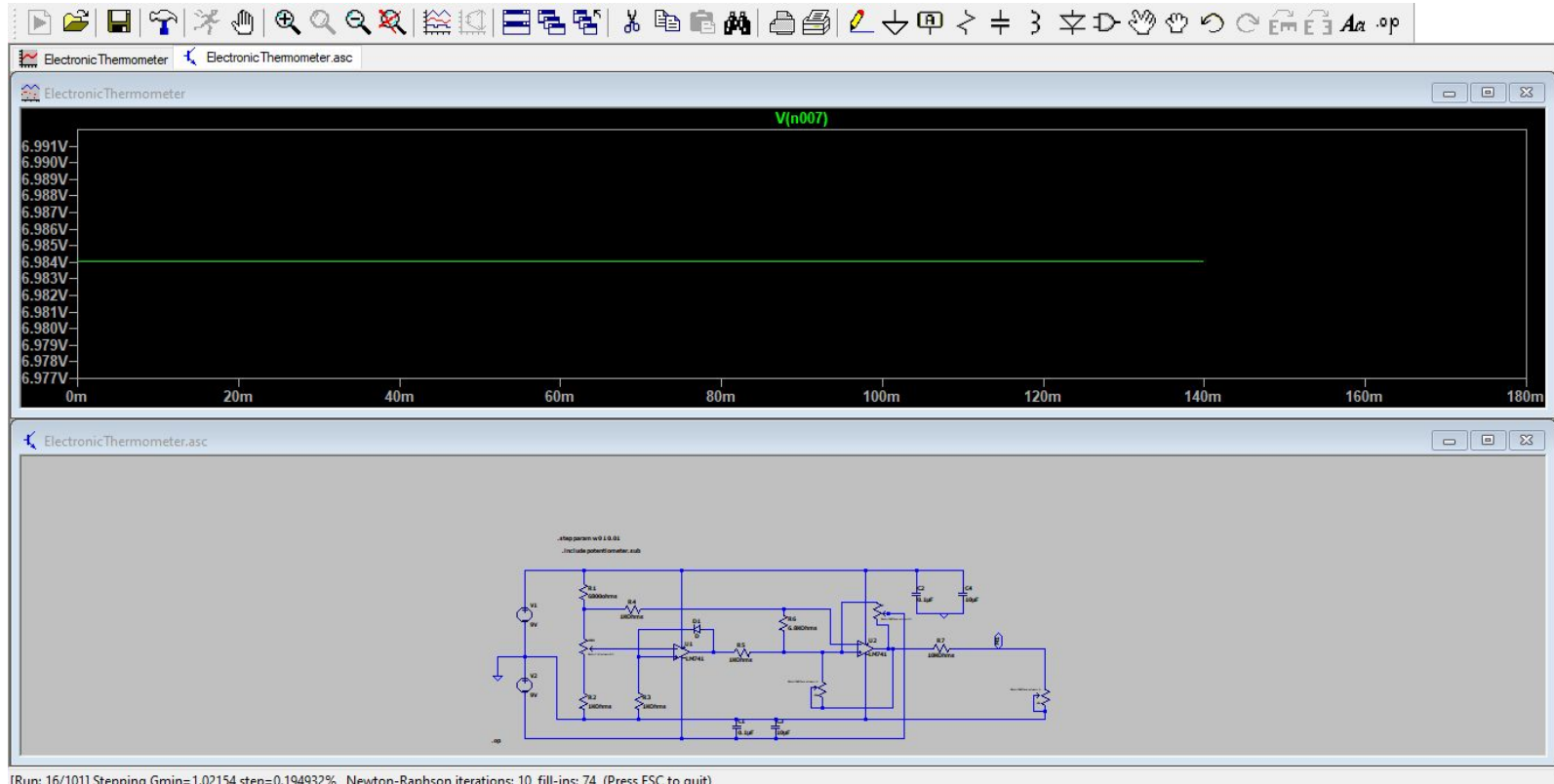# Circuit diagram :
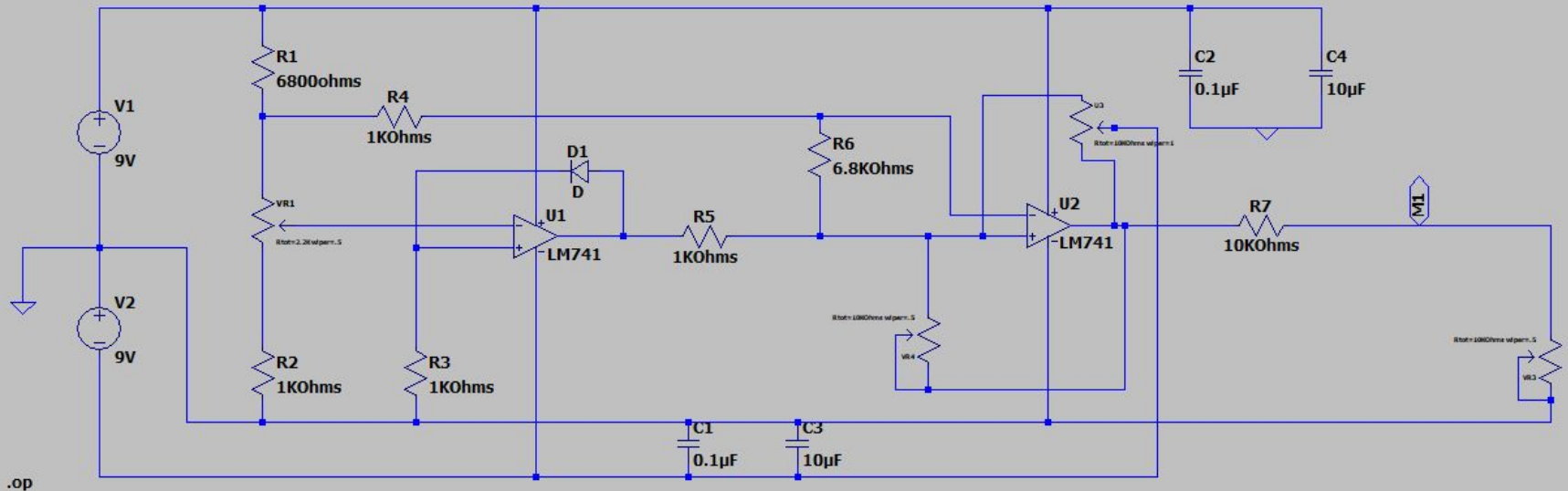
Screenshots : Potentiometer (1)

Screenshots : Potentiometer (0.5)
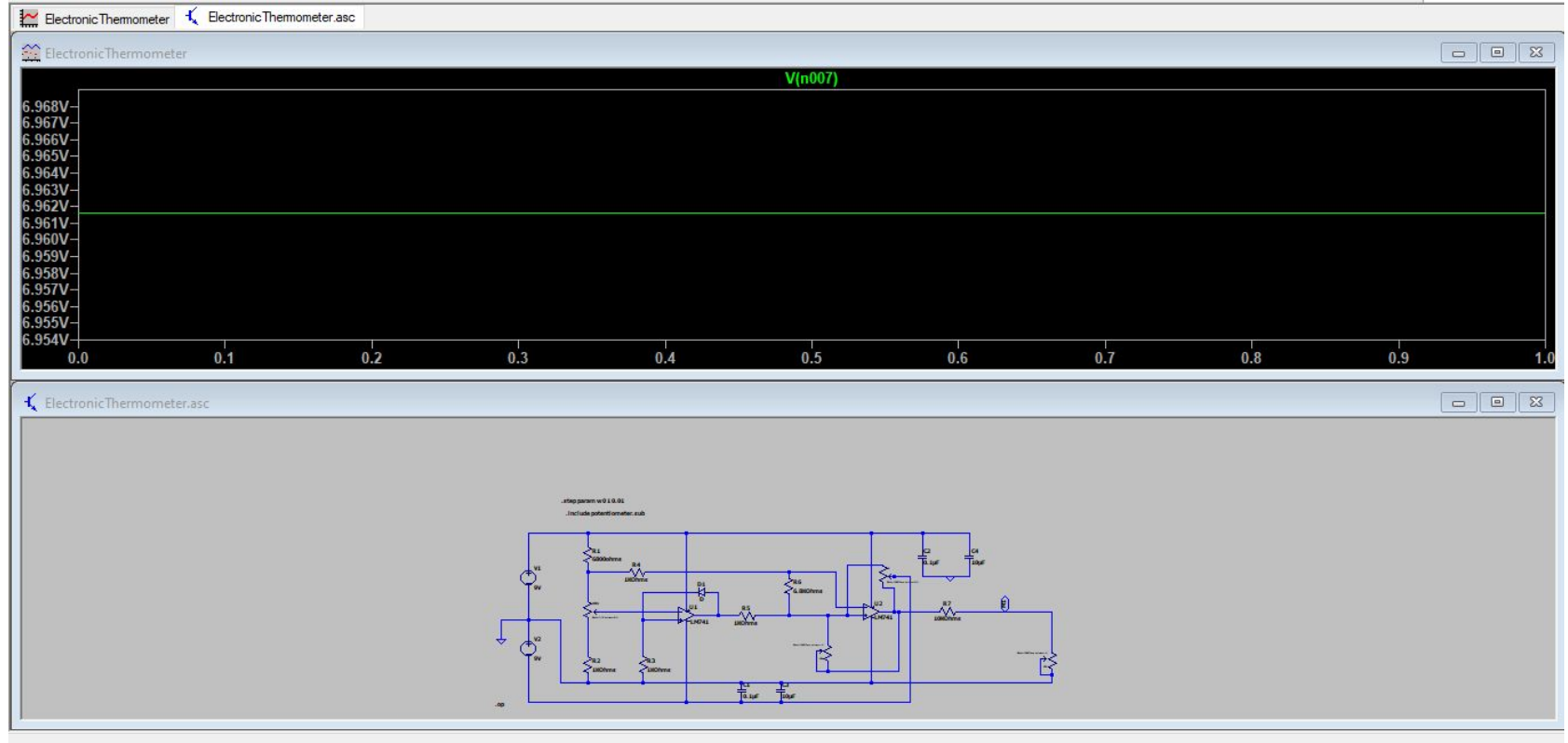
Screenshots : Potentiometer (0.1)

Learn outcomes

-LTSpice installation.

-Thermometer and types of thermometer

-Creating circuit(schematic) on LTSpice

-Usage of features like label.

-Adding extra components according to requirement

-Simulating the circuit according to requirement

Leading Vendors :

- Omron
- Vandelay
- Yuwell
- Dr Trust (USA)

Thank You